West Coast Queen Charlotte Islands Groundfish Bottom Trawl Survey, August 25th to September 21st, 2008

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Nanaimo, BC
V9T 6N7

2008

Canadian Manuscript Report of Fisheries and Aquatic Sciences 2858

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Canadian Manuscript Report of
Fisheries and Aquatic Sciences 2858

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Cat. No. 97-4/2858E ISSN 0706-6473

Correct citation for this publication:

Olsen, N., Rutherford, K.L., and Stanley, R.D. 2008. West Coast Queen Charlotte Islands groundfish bottom trawl survey, August 25th to September 21st, 2008. Can. Manuscr. Rep. Fish. Aquat. Sci. 2858: vii + 50 p.

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ABSTRACT

Olsen, N., Rutherford, K.L., and Stanley, R.D. 2008. West Coast Queen Charlotte Islands groundfish bottom trawl survey, August 25th to September 21st, 2008. Can. Manuscr. Rep. Fish. Aquat. Sci. 2858: vii + 50 p.

A bottom trawl survey of the west coast of the Queen Charlotte Islands was conducted on the fishing vessel F/V Frosti between August 25th and September 21st, 2008. The survey was jointly conducted and funded by the Canadian Groundfish Research and Conservation Society (CGRCS) and Fisheries and Oceans Canada (DFO). It was the third in what is intended to be a long-term survey series, coordinated with other area-specific surveys that together cover the continental shelf and upper slope of most of the British Columbia coast. The objective of these surveys is to provide fishery-independent abundance indices of all demersal fish species available to bottom trawling, as well as to collect biological samples of selected species.

The survey conducted 117 successful tows from a total of 127. The mean catch per successful tow was 1,068 kg, averaging about 21 different species of fish and invertebrates in each. The most abundant fish species encountered was Pacific ocean perch followed by rougheye rockfish, and sharpchin rockfish. Biological data, including individual length, weight, sex, maturity, and age structure, were collected from 49 different species of fish. Oceanographic data and net geometry were also recorded for most tows, including water temperature, depth, headrope height, and doorspread.

RÉSUMÉ

Olsen, N., Rutherford, K.L., and Stanley, R.D. 2008. West Coast Queen Charlotte Islands groundfish bottom trawl survey, August 25th to September 21st, 2008. Can. Manuscr. Rep. Fish. Aquat. Sci. 2858: vii + 50 p.

Un relevé au chalut de fond a été effectué sur la côte Ouest des îles de la Reine-Charlotte à partir du bateau de pêche F/V Frosti entre le 25 août et le 21 septembre 2008. Le relevé a été effectué et financé conjointement par la Canadian Groundfish Research and Conservation Society (CGRCS) et Pêches et Océans Canada (MPO). Il s'agit la troisième d'une série de relevés qui s'effectueront sur le long terme, en coordination avec d'autres relevés spécifiques à certaines zones qui ensemble couvriront le plateau continental et le versant ascendant de la plus grande partie du littoral de la Colombie-Britannique. L'objectif de ces relevés est d'obtenir des données indépendantes des pêches sur l'abondance de toutes les espèces de poissons démersaux accessibles au chalut de fond ainsi que d'obtenir des échantillons biologiques de certaines espèces choisies.

Au total, le relevé a permis d'effectuer 117 passages au chalut fructueux sur 127. Le poids total moyen des prises par trait de chalut était de 1,068 kg et on comptait en moyenne 21 espèces différentes de poissons et d'invertébrés par trait. L'espèce la plus abondante était le Sébaste à longue mâchoire, suivi par le Sébaste à œil épineux et le Sébaste forte menton. Des données biologiques, notamment la longueur, le poids, le sexe, le degré de maturité, l'âge ont été recueillies pour 49 espèces différentes de poissons. Des données océanographiques et la géométrie des filets ont également été enregistrées pour la plupart des traits, notamment la température et la profondeur de l'eau, la hauteur de la ralingue supérieure et la largeur de la porte.

INTRODUCTION

In 2003 a report by the Pacific Scientific Advice Review Committee (PSARC) recommended development of fishery-independent relative abundance indices using bottom trawl surveys in British Columbia waters (Sinclair et al., 2003). As an initial step, the report recommended that a pilot survey be conducted in PMFC major areas 5A and 5B (Queen Charlotte Sound). This region was recommended in part because it is not covered by other bottom trawl surveys and it represents a significant portion of the commercial bottom trawl fishery.

The first Queen Charlotte Sound survey was successfully completed in the summer of 2003 (Olsen et al., 2007). Following that, additional surveys were planned for the west coast of Vancouver Island beginning in 2004, Hecate Strait beginning in 2005, and the west coast of the Queen Charlotte Islands beginning in 2006. These surveys are to be conducted on a rotating biennial schedule with the Queen Charlotte Sound and Hecate Strait surveys conducted in odd-numbered years and the west coast Vancouver Island and west coast Queen Charlotte Islands surveys conducted in even-numbered years. Together they provide comprehensive coverage of the continental shelf and upper slope of the British Columbia coast (Figure 1).

The first west coast Queen Charlotte Island survey was successfully completed in 2006 (Workman et al., 2007). The second survey was originally scheduled for 2008, however in 2007 an unanticipated funding source became available that enabled us to conduct an additional, previously unscheduled survey of this area. Delays in finalizing the contract led to a later than normal start for the survey (mid September as opposed to mid August), and this, in conjunction with work stoppages due to inclement weather meant that we ultimately had to remove the deepest stratum from the survey due to time constraints. This stratum, covering depths from 800 m to 1,300 m, includes important habitat for fish species such as longspine thornyhead, sablefish, and Pacific and giant grenadier. These and other deepwater species are thus absent or greatly underrepresented in the 2007 results (Workman et al., 2008).

The third west coast Queen Charlotte Island survey occurred between August 25th and September 21st, 2008 and this document presents a brief synopsis of the results. The deepest stratum (800 m to 1,300 m) was again surveyed as in 2006. Thus, both the timing and spatial coverage are more comparable to the 2006 survey. This survey marked our first attempt at distinguishing a new species of rockfish, blackspotted rockfish (*Sebastes melanostictus*), which was previously identified as rougheye rockfish (*Sebastes aleutianus*). However, we ultimately did not have enough confidence in our ability to distinguish the two species and so all potential blackspotted rockfish are reported here as rougheye rockfish. As our ability to identify this new species improves we will be including separate catch and sampling information for both blackspotted and rougheye rockfish.

METHODS

VESSEL AND FISHING GEAR

The survey was conducted aboard the commercial stern trawler F/V Frosti (Figure 2). The trawl net used was an Atlantic Western IIA box trawl (Table 1, Figure 3) connected to 1,477 kg 4.5 m^2 INJECTOR doors.

STAFF SUMMARY

A total of 18 personnel were involved in the survey, which was split into four sections of 7 to 9 days duration, with 12 personnel in each. The Canadian Groundfish Conservation and Research Society (CGCRS) provided funding for the crew of the Frosti and employees of Archipelago Marine Research Ltd. (AMR). All other staff were funded by Fisheries and Oceans Canada (DFO) (Table 2).

SURVEY DESIGN

The study area consists of the west coast of the Queen Charlotte Islands, from approximately latitude 52° 45' N to latitude 54° 35' N, covering depths from 180 to 1,300 meters (Figure 4), and categorized into four strata (Table 3). The northern region, extending into Dixon Entrance, is nearly contiguous with the northwestern-most extent of the Hecate Strait survey except for a gap around Learmonth Bank (Figure 1), which we omitted from the survey to avoid catches of red tree coral (*Primnoa* sp.) that are common to that area.

We divided the survey area into a contiguous grid of 4 km^2 blocks and from these we randomly selected 145 primary fishing locations (Figure 5) based on a target allocation of 125. We arrived at the figure of 145 by calculating our per-stratum failure rates from previous surveys and applying these factors to our 2008 allocation scheme to compensate for the anticipated rate of failure.

OPERATIONS

Fishing

Fishing commenced at sunrise and ended at sunset each day, where start and end fishing is defined as the trawl net on, and off bottom, respectively. This yielded an average working day length of about 10 hours.

On each day prior to fishing, the captain and chief scientist reviewed the selected fishing locations to determine a candidate set of locations to visit throughout the day. During this review process the captain would sometimes determine, based on his experience and knowledge of an area, that one or more locations were not fishable. In such cases we would mark the locations as "rejected based on prior knowledge". After compiling a list of candidate locations to be visited, the captain would then plan the most efficient route of travel between locations.

We frequently began fishing immediately on arrival at a fishing location. However, if the captain was not familiar with an area we would "sound" the region

(traverse the location and examine the depth sounder trace) to determine if it was suitable for trawling. If it was not, we marked the location as "rejected based on inspection".

When trawling, the captain would attempt to tow through the center of the 4 km^2 fishing block, usually following a depth contour. However, where the bottom topography made this difficult or impossible, the captain would trawl wherever he felt he could obtain a successful result, with the stipulation that at least half of the total trawl track had to be within the 4 km^2 block. The scope used in 2008 is shown in Table 4 and Figure 6.

To determine the start of each tow, we monitored the real-time net sensor data to establish when the net reached the sea floor and the headrope collapsed to a height of about three to four meters, at which point we considered the net to be actively fishing. Targeted on-bottom time was 20 minutes for shallow tows (those in water less than 500 m deep), and 40 minutes for tows deeper than this. Net haul-back was done one minute prior to the end of the shallow tows, and five minutes prior to the end of the deep tows in order to compensate for slack in the warps, which creates a lag before the net leaves the bottom. Although our target on-bottom time was 20 minutes for shallow tows and 40 minutes for deep tows, we accepted tows that were at least 15 minutes and 30 minutes, respectively. This was a pragmatic decision that allowed us to retain many tows that would otherwise have been failures due to hang-ups or early haul-backs.

The result of trawling was either a successful tow, or a hang-up or tear-up of the trawl net. In the event of a hang-up or tear-up, we would either mark the location as "rejected after one or more attempts to fish" or make additional attempts to fish. Thus, we kept records of the three scenarios that resulted in a location being removed from the sampling frame:

- Rejection based on prior knowledge
- Rejection based on on-ground inspection
- Rejection based on one or more failed fishing attempts

Rejected locations were removed from the sampling frame for the current and all future surveys. Thus, every year of the survey results in the removal of some unfishable area, which over time, will lead to increasing efficiency (i.e. we will spend less time surveying areas that cannot be fished).

This year our contract with the fishing vessel included fixed start and end dates. Due to this restriction we had insufficient time to visit all of our allocated fishing locations and had to randomly remove 11 of them in order to finish the survey by the prescribed finish date. For all future surveys we will stipulate an open finish date in the contract as it is always our intention to visit all allocated fishing locations during every survey.

Gear and Oceanographic Sensors

The trawl net was equipped with a variety of real-time sensors including doorspread and headrope height. These sensors transmitted data to a bridge computer once per second and allowed us to continually monitor the net during fishing. In addition to these real-time sensors, we also attached data-logging probes to collect water temperature, net depth, salinity, and dissolved oxygen (Seabird 39 and Seabird 19*plus*

probes) and contact of the trawl net with the sea floor (MacMarine (NMFS) Bottom Contact Sensor). Unfortunately, damage to the Seabird 19*plus* occurred during the first week of the survey and we were unable to obtain a replacement unit until the third leg. Thus, there are no data from this probe between August 30th and September 10th.

Catch Processing

Codend contents were dumped into a large sorting bin approximately three meters long by two meters wide. Whenever possible the catch was completely sorted by species and weighed. However there were eight occasions when the total catch was large enough that a total sort was deemed too time consuming. In such cases we would perform one of the following sort methods:

1. If the catch was dominated by a single species, we weighed 10 baskets of that species to obtain an average weight per basket. We then counted the remaining baskets of that species without weighing them, and applied the average weight per basket to each to obtain an estimate of the total weight of that species. We then sorted and weighed the rest of the catch to species as usual.
2. If the catch was not dominated by a single species but consisted of many species in large amounts we took a random sample of 15 to 20 baskets and weighed each to obtain an average weight per basket. We then counted the remaining baskets of catch and applied the average basket weight to each, to obtain an estimate of the total catch weight. We then sorted and weighed the 15 to 20 sub-sampled baskets to species to obtain an estimate of proportional species composition, and applied those proportions to the entire catch weight. The only species exempt from this protocol were large, conspicuous fish that normally occur in small numbers, such as Pacific halibut and skates. These species were completely sorted and weighed.
3. For very large catches (greater than about 5,000 kg), the captain and the deck boss both provided visual estimates of the total catch weight. We took the average of these estimates as the final value for the total catch weight. We then emptied approximately one- third of the net contents directly into the fish hold, followed by one-third into the sorting bin, and then the final one-third into the fish hold. We then completely sorted and weighed the sorting bin contents to species and applied the species proportions of the sorted catch to the entire catch weight.

Biological Sampling

While the primary purpose of the survey was to generate fishery-independent indices of relative abundance, our secondary goal was to collect associated biological information on the size, sex, and age-composition of selected species. In particular, our biological sampling priorities were to collect length and sex frequencies on all species in the catch of each tow, subject to the minimum number of specimens and sampling frequency criteria (Table 5). Several species that we frequently encounter in large numbers such as arrowtooth flounder, we sampled on a rotating schedule, for example,

every second or third tow, in order to provide more sampling opportunities for under-represented species.

From every tow we also selected one age sample (which includes sampling for length, sex, age, weight, maturity, and age structure) and one weight sample (which includes the same attributes minus the age structure) from the top two dominant species by weight. Our objective over the course of the survey is to collect up to approximately 300 total ageing structures from each species, and up to about 200 weight samples per survey stratum. Once these levels are achieved, we have the option of selecting less dominant species from the catch. Thus we are able to increase the variety of species that we sample for age and weight. However, irrespective of these considerations, we always take an age or weight sample from very large and dominant catches of a given species, and we always take an age samples from certain species that, for various reasons, are deemed "high priority" (Table 6).

BIOMASS INDICES

The relative biomass index of individual fish species captured in the survey was obtained by multiplying the mean catch density per stratum by the area in each stratum and summing over all strata:

$$B = \sum_{i=1}^{k} C_i A_i = \sum_{i=1}^{k} B_i$$

where C_i = mean catch density (kg/km^2) for species s in stratum i.

A_i = area of stratum i (km^2).

B_i = biomass of species s in stratum i.

k = number of strata.

The mean catch density (C_i) in each stratum was calculated by:

$$C_i = \frac{\sum_{j=1}^{n_i} \left(W_j / D_j w_j \right)}{n_i}$$

where W_j = catch weight (kg) of tow j in stratum i.

D_j = length (km) of tow j in stratum i.

w_j = mean net width (doorspread; km) of tow j in stratum i.

n_i = number of tows in stratum i.

One thousand bootstrap replicates with replacement were performed on the survey data to estimate bias corrected 95% confidence limits and relative error for each biomass estimate (Efron 1982), with relative error defined as the coefficient of variation (CV) of the distribution of the 1000 bootstrapped estimates.

RESULTS

FISHING

We divided the survey into four sections of 7 to 9 days. This duration was short enough that we were able to retain a significant amount of the catch, which was sold fresh at the end of each leg, and also allowed us to rotate the science crews. The survey began and ended at the Pacific Biological Station in Nanaimo, while the mid-survey offloads and crew changes were performed in Prince Rupert.

From a total of 28 survey days, approximately 6 days were required for travel at the start and end of the survey, 4 days were required for offloading catch and changing crews, and part of 1 day was lost to inclement weather. Thus, we ended with a total of 13 full fishing days and 6 partial days in which time we conducted 127 tows, of which 117 were successful and 10 were unsuccessful due to hang-ups or tear-ups, for an average of about 6.2 successful tows per fishing day, or about 4.2 successful tows per survey day (

Table 7).

The final status of the 2008 sampling frame includes 117 successfully fished locations, 14 locations rejected prior to fishing, 3 locations rejected after one or more failed fishing attempts, and 11 locations that were not fished (Figure 7). These 11 un-fished locations were randomly removed prior to finishing the survey in order that we could complete the survey within the prescribed start and end dates as established in the survey contract. Our favoured methodology is to visit all allocated fishing locations over the duration of a survey and for all future surveys we intend to change the stipulations established by the contract to reflect this requirement.

CATCH

Catch weight per tow was typically less than 2,000 kg, averaging 799 kg, and we usually observed about 15 to 25 species per tow (Figure 8 and Figure 9). We caught a total of 112,969 kg of fish and invertebrates. Most of this (112,103 kg) consisted of 77 different taxonomic groups of fish, including 23 rockfish taxa and 9 flatfish taxa. The remainder (866 kg) consisted of 57 invertebrate groups (Table 8). Of the fish species, Pacific ocean perch was the most dominant by weight, followed by rougheye rockfish, silvergray rockfish, and sharpchin rockfish (Table 9). Significant amounts of marketable fish, especially Pacific ocean perch, were offloaded (Table 10).

SAMPLES AND SPECIMENS

We sampled 48 species of fish for attributes such as length, weight, sex, maturity, and age structure (Table 11, Table 12, and Table 13).

GEAR AND OCEANOGRAPHIC SENSORS

We collected Seabird 39 data (water temperature and depth) from 127 tows (Table 14, Figure 10), and Seabird 19*plus* data (water temperature, depth, salinity, and dissolved oxygen) from 70 tows (Table 14). Although we have not yet analyzed these data in detail, they may prove useful for explaining or at least correlate to, abundance trends. They will also be added to a growing database of oceanographic data housed at the Institute of Ocean Sciences, Sidney, British Columbia, and made available to other researchers.

We collected bottom contact data, using the NMFS Bottom Contact Sensor, from 111 tows (Table 14). These data provide a record of the trawl net contact with the sea floor and thus are useful not only for determining the quality and duration of the sea floor contact, but also indicate the relative rugosity of the sea floor (Figure 11).

Although sensors attached to the trawl net continued to operate over the duration of the survey, we were unable to log these data for most of the survey, due to technical problems. Thus net sensor data such as net depth, doorspread, and headrope height were only collected from the first 58 tows (Table 14).

Global positioning system (GPS) data were logged continuously throughout the survey. Thus, these data are available for all 127 tows (Table 14).

BIOMASS INDICES

Figure 12 shows the relative biomass indices of selected fish species from the 2006 and 2007, and 2008 west coast Queen Charlotte Islands surveys. The species shown are those for which the relative error of the biomass index was less than 0.5. Each row of the figure gives the common name of the species, a small graphical depiction of the 95% confidence limits of the biomass index for each year (vertical bars) joined by a line connecting the biomass indices, and finally, the numerical value of the biomass index for each year. Results are sorted in alphabetical order by species name.

Because estimates of biomass are highly influenced by estimates of the area covered by the survey, by estimates of mean doorspread, and by estimates of tow length, they should be not be considered as absolute indices of abundance but only as relative estimates. In addition, as the surveyed area will decrease over time due to the accumulation of unfishable regions, we can expect that the biomass estimates given in Figure 12 will not remain constant over time.

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Table 1. Gear specifications.

Part	Length	Material
Rigging		
Doors	1 pair	4.5 m^2 INJECTOR doors wegihing 3250 lbs. each
Pickups	19' 6"	7/8" cable
Door Legs	16'	5/8" chain
Sweep Line	90'	7/8" cable
Upper bridle	90'	3/4" cable
Lower bridle	90'	7/8" cable
Net frame		
Headline	74' 6"	11 mm Long link chain
Headline floats	89	8" plastic Spheres
Riblines		1 1/4 " Polysteel rope
Bolsch Line	68' 4"	1" poly steel rope
Fishing Line	107' 4"	11 mm Long link chain
Wing Lines	22' 3"	11 mm Long link chain
Foot Rope		
Foot Rope	107' 4"	11 mm long link Chain
Foot rope bosom	14'	18" tire gear spaced 6 in on center
Foot rope wing1	18'	18" rock hopper, 18 " disks spaced 21 " apart
Foot rope wing2	8' 8"	18" rock hopper, 18 " disks spaced 21 " apart
Wing extension	19' 8"	5" rubber disks in front of 18 " half egg
Web		
Belly	5"	3.5 mm Euroline premium
Square	5"	3.5 mm Euroline premium
Side Panel	5"	3.5 mm Euroline premium
Taper	4.5"	3.5 mm Euroline premium
Intermediate	4.5"	4.5 mm Euroline premium
Codend	4.5"	4 mm orange poly
Guard Mesh	4.5 or 5 "	Double 4.5 mm Euroline premium
Liner	3/4"	Notless Nylon

Table 2. Survey personnel for each leg of the survey.

Leg	Dates	Person	Role	Affiliation
1	August 25th to September 2nd	Dave Clattenburg	Captain	Frosti Fishing Ltd.
		Norm Olsen	Chief Scientist	DFO
		Scott Anderson	Science	AMR
		Matt McKay	Science	AMR
		Dan Erskine	Science	AMR
		Jon Eis	Science	AMR
		Marcus Heyes	Science	AMR
		Brent Parkinson	Fishing Ops	Frosti Fishing Ltd.
		Colin Leslie	Fishing Ops	Frosti Fishing Ltd.
		Greg Newman	Fishing Ops	Frosti Fishing Ltd.
		Dariusz Kowalewski	Engineer/Fishing Ops	Frosti Fishing Ltd.
		Penny Parkinson	Cook	Frosti Fishing Ltd.
2	September 2nd to September 8th	Dave Clattenburg	Captain	Frosti Fishing Ltd.
		Kate Rutherford	Chief Scientist	DFO
		Brian Krishka	Science	DFO
		Matt McKay	Science	AMR
		Dan Erskine	Science	AMR
		Jon Eis	Science	AMR
		Marcus Heyes	Science	AMR
		Brent Parkinson	Fishing Ops	Frosti Fishing Ltd.
		Colin Leslie	Fishing Ops	Frosti Fishing Ltd.
		Greg Newman	Fishing Ops	Frosti Fishing Ltd.
		Dariusz Kowalewski	Engineer/Fishing Ops	Frosti Fishing Ltd.
		Penny Parkinson	Cook	Frosti Fishing Ltd.
3	September 8th to September 14th	Dave Clattenburg	Captain	Frosti Fishing Ltd.
		Karina Cooke	Chief Scientist	DFO
		Frank Parent	Science	AMR
		Matt McKay	Science	AMR
		Dan Erskine	Science	AMR
		Scott Anderson	Science	AMR
		Marcus Heyes	Science	AMR
		Brent Parkinson	Fishing Ops	Frosti Fishing Ltd.
		Colin Leslie	Fishing Ops	Frosti Fishing Ltd.
		Greg Newman	Fishing Ops	Frosti Fishing Ltd.
		Dariusz Kowalewski	Engineer/Fishing Ops	Frosti Fishing Ltd.
		Penny Parkinson	Cook	Frosti Fishing Ltd.
4	September 14th to September 21st	Dave Clattenburg	Captain	Frosti Fishing Ltd.
		Rick Stanley	Chief Scientist	DFO
		Schon Acheson	Science	DFO
		Matt McKay	Science	AMR
		Dan Erskine	Science	AMR
		Frank Parent	Science	AMR
		Marcus Heyes	Science	AMR
		Brent Parkinson	Fishing Ops	Frosti Fishing Ltd.
		Colin Leslie	Fishing Ops	Frosti Fishing Ltd.
		Greg Newman	Fishing Ops	Frosti Fishing Ltd.
		Dariusz Kowalewski	Engineer/Fishing Ops	Frosti Fishing Ltd.
		Penny Parkinson	Cook	Frosti Fishing Ltd.

Notes: AMR = Archipelago Marine Research
DFO = Fisheries and Oceans Canada

Table 3. Definition of survey strata with the target and delivered tow allocation in each.

Depth Stratum Meters	Depth Stratum Fathoms	Area (km2)	Target Tows	Allocated Tows	Successful Tows
180 - 330	98 - 180	1,326	74	90	71
330 - 500	180 - 273	1,090	31	33	30
500 - 800	273 - 437	927	10	11	8
800 - 1300	437 - 711	2,228	10	11	8
			125	**145**	**117**

Table 4. Mean warp length and scope by depth interval.

Depth (m)	Mean Warp (m)	Mean Warp (fa)	Mean Scope	Mean Depth (fa)
150 - 200	457	250	2.6	96
200 - 250	529	289	2.3	123
250 - 300	636	348	2.3	150
300 - 350	771	422	2.4	177
350 - 400	834	456	2.3	201
400 - 450	908	496	2.1	233
450 - 500	930	508	2.1	248
500 - 550	1,170	640	2.3	284
550 - 600	-	-	-	-
600 - 650	1,271	695	2.0	340
650 - 700	-	-	-	-
700 - 750	1,427	780	2.0	396
750 - 800	1,463	800	1.9	414
800 - 850	1,555	850	1.9	459
850 - 900	-	-	-	-
900 - 950	1,646	900	1.8	493
950 - 1,000	1,943	1,063	2.0	529
1,000 - 1,050	1,966	1,075	2.0	547
1,050 - 1,100	-	-	-	-
1,100 - 1,150	2,103	1,150	1.8	624

Table 5. Length frequency sampling frequency and minimum sample sizes per species.

Common name	Sampling Frequency	Minimum Sample Size
Aurora rockfish	1	1
Blackfin Sculpin	1	5
Blackgill rockfish	1	1
Boccacio rockfish	1	1
Brown cat shark	1	1
Canary rockfish	1	5
Darkblotch rockfish	1	5
Deepsea sole	1	1
Dogfish	1	5
Dover sole	3	5
Eelpout	1	10
Greenstripe rockfish	1	5
Hake	3	25
Halibut	1	1
Harlequin rockfish	1	1
English sole	1	5
Lingcod	1	1
Long nose skate	1	1
Longspine thornyhead	1	5
Pacific cod	1	1
Pacific flatnose	1	5
Pacific herring	1	25
Pacific ocean perch	2	10
Petrale (Brill) sole	1	1
Pollock	1	5
Ratfish	1	10
Rattail	1	5
Redbanded rockfish	2	5
Redstripe rockfish	1	5
Rex sole	3	10
Rock sole	1	1
Rosethorn rockfish	1	5
Rougheye rockfish	2	5
Sablefish	2	5
Sandpaper skate	1	1
Sharpchin rockfish	1	10
Shortraker rockfish	1	1
Shortspine thornyhead	2	5
Silvergray rockfish	2	5
Slender sole	1	10
Splitnose rockfish	1	5
Turbot	3	10
Widow rockfish	1	5
Yellowmouth rockfish	1	5
Yellowtail rockfish	1	5
All Other Species		5

Table 6. High priority species for age structure sampling.

Species common name	Min. Sample Size	Structure
Pacific Cod	10	2nd Dorsal fin
Rock sole	10	Otolith
Petrale sole	10	Otolith
Lingcod	10	2nd Dorsal fin
Redbanded rockfish	5	Otolith
Bocaccio	1	Otolith
Copper rockfish	1	Otolith
Darkblotched rockfish	1	Otolith
Quillback rockfish	1	Otolith
Shortraker rockfish	1	Otolith
Yelloweye rockfish	1	Otolith

Table 7. Summary of daily operations. "Hours Fishing" is the duration between the net-on-bottom on the first tow of the day to the net-off-bottom on the last tow of the day.

Date	Start Fishing	End Fishing	Hours Fishing	Successful Tows	Failed Tows	Total Tows	Travel Day?	Offload Day?	Weather Delay?
8/25/2008	-	-	-	-	-	-	✓		
8/26/2008	-	-	-	-	-	-	✓		
8/27/2008	-	-	-	-	-	-	✓		
8/28/2008	7:38	21:08	14	5	1	6			
8/29/2008	7:14	17:43	10	4	1	5			
8/30/2008	7:09	20:16	13	7	0	7			
8/31/2008	6:57	20:30	14	7	1	8			
9/1/2008	7:09	15:18	8	6	0	6			
9/2/2008	-	-	-	-	-	-		✓	
9/3/2008	7:45	20:13	13	9	0	9			
9/4/2008	7:13	19:13	12	8	0	8			
9/5/2008	7:05	19:15	12	8	1	9			
9/6/2008	8:27	18:24	10	6	0	6			
9/7/2008	7:14	15:00	8	5	0	5			
9/8/2008	-	-	-	-	-	-		✓	
9/9/2008	18:45	20:28	2	2	0	2			✓
9/10/2008	7:46	20:12	13	6	1	7			
9/11/2008	7:20	18:40	11	7	2	9			
9/12/2008	7:33	20:03	13	6	1	7			
9/13/2008	7:21	16:23	9	6	1	7			
9/14/2008	-	-	-	-	-	-		✓	
9/15/2008	13:03	19:44	6	5	0	5			
9/16/2008	7:21	19:09	12	8	1	9			
9/17/2008	7:26	19:29	12	8	0	8			
9/18/2008	7:40	15:13	8	4	0	4			
9/19/2008	-	-	-	-	-	-	✓	✓	
9/20/2008	-	-	-	-	-	-	✓		
9/21/2008	-	-	-	-	-	-	✓		
Total			**200**	**117**	**10**	**127**	**6**	**4**	**1**
Average Per Day			**10.5**	**6.2**	**0.5**	**6.7**			

Table 8. Catch composition by species group.

Species Category	Number of Taxa	Weight (kg)
All fish	77	112,103
Rockfish	23	91,688
Flatfish	9	10,300
Roundfish	9	8,733
Cartilaginous fish	9	1,225
Other fish	27	157
Invertebrates	57	866

Table 9. All captured species, ordered by total catch weight, showing number of tows in which the species occurred, total catch weight, maximum and mean per-tow catch weight, and biomass and relative error from bootstrapped area expanded estimates.

Species	Number of Tows	Catch Weight (kg) Total	Maximum	Mean	Biomass (tonnes)	Relative Error
Pacific ocean perch	90	48,870.6	6,179.7	543.0	8,371.4	0.21
Rougheye rockfish	57	20,892.8	5,656.5	366.5	5,712.3	0.42
Sharpchin rockfish	69	12,684.6	5,027.5	186.5	1,687.9	0.45
Silvergray rockfish	71	9,808.1	2,352.5	138.1	1,281.6	0.28
Arrowtooth flounder	104	6,334.3	822.3	60.9	1,143.9	0.19
Shortspine thornyhead	105	4,914.7	254.2	46.8	1,137.8	0.09
Redstripe rockfish	39	4,375.2	1,308.7	112.2	601.8	0.43
Pacific hake	70	3,788.5	442.1	54.1	817.7	0.19
Sablefish	73	2,711.1	251.2	37.1	1,370.3	0.15
Dover sole	102	2,198.2	129.4	21.8	472.7	0.13
Yellowmouth rockfish	25	2,143.6	1,032.3	85.7	282.2	0.56
Rex sole	101	1,282.7	105.1	12.7	196.2	0.13
Shortraker rockfish	23	991.7	349.4	43.1	317.5	0.43
Widow rockfish	24	864.2	418.9	36.0	111.2	0.58
Redbanded rockfish	73	757.2	92.3	10.4	107.0	0.19
Spotted ratfish	75	644.2	98.0	8.6	93.2	0.20
Pacific grenadier	14	574.1	183.4	41.0	606.0	0.34
Rosethorn rockfish	69	559.5	54.4	8.1	86.3	0.16
Giant grenadier	18	472.1	81.6	26.2	360.5	0.19
Longnose skate	44	458.8	50.2	10.9	84.7	0.20
Red king crab	2	443.9	442.0	221.9	-	-
Lingcod	22	434.6	142.0	19.8	58.8	0.37
Darkblotched rockfish	13	430.2	133.2	33.1	93.0	0.50
Longspine thornyhead	17	385.2	52.1	22.7	266.6	0.15
Walleye pollock	40	284.1	27.5	7.1	40.2	0.22
Pacific halibut	25	264.4	31.6	10.6	45.3	0.28
Popeye	13	211.9	46.0	16.3	212.4	0.20
Greenstriped rockfish	26	168.2	41.6	6.5	22.5	0.34
Harlequin rockfish	45	137.7	55.4	3.1	18.5	0.54
Primnoa	13	132.8	47.8	14.8	-	-
Pacific cod	20	117.2	19.3	5.9	15.2	0.28
Rockfish	4	102.9	57.4	25.7	-	-
Bocaccio	12	81.5	12.3	6.8	12.2	0.29
Schoolmaster gonate squid	37	75.6	16.0	2.1	-	-
Sponges	29	71.6	40.5	3.4	-	-
Petrale sole	17	66.2	35.6	3.9	8.7	0.53
Pacific flatnose	15	62.5	23.9	4.2	54.2	0.46
Aurora rockfish	5	53.7	17.9	10.7	18.7	0.50
Yelloweye rockfish	5	46.1	17.9	9.2	6.0	0.49
English sole	19	41.3	12.1	2.2	5.3	0.38
Pygmy rockfish	7	38.4	34.9	6.4	5.2	0.92
Yellowtail rockfish	6	38.2	17.6	6.4	5.0	0.52
Blackfin sculpin	54	35.2	3.6	0.9	5.5	0.22
Aleutian skate	6	33.7	15.4	5.6	6.3	0.46

Table 9. Continued

Species	Number of Tows	Catch Weight (kg) Total	Maximum	Mean	Biomass (tonnes)	Relative Error
Fragile urchin	38	33.0	13.0	2.1	-	-
Splitnose rockfish	21	28.9	8.7	1.6	5.8	0.42
Dusky rockfish	5	28.1	16.4	5.6	3.6	0.62
Roughtail skate	8	26.6	12.0	3.3	26.7	0.43
Canary rockfish	8	25.3	6.6	3.2	3.3	0.40
Chum salmon	5	23.2	6.0	4.6	3.0	0.44
Sandpaper skate	11	19.2	3.7	1.7	3.8	0.34
Prawn	33	18.3	1.9	0.8	-	-
Grooved tanner crab	8	16.4	5.8	2.1	-	-
Spiny dogfish	6	15.4	3.7	2.6	2.0	0.42
Ratfishes	1	11.8	11.8	11.8	-	-
Slender sole	42	11.6	1.0	0.3	1.7	0.20
Anemone	29	10.4	7.3	1.7	-	-
Twoline eelpout	11	10.4	2.4	0.9	7.5	0.34
Bath sponges	9	9.7	3.0	1.4	-	-
Deepsea sole	10	8.8	2.3	0.9	4.3	0.29
Bigmouth sculpin	1	7.5	7.5	7.5	0.9	1.00
Lithodes couesi	4	6.6	6.0	2.2	-	-
Paragorgia pacifica	2	5.6	5.6	5.6	-	-
Brown cat shark	5	4.8	1.8	1.0	2.6	0.42
Glass sponges	10	4.2	2.8	1.1	-	-
Jellyfish	14	3.9	2.2	0.6	-	-
Squids	5	3.7	2.3	0.9	-	-
Black eelpout	10	3.7	1.1	0.4	0.6	0.38
Butter sole	1	3.1	3.1	3.1	0.4	1.01
Sidestripe shrimp	21	2.7	0.6	0.4	-	-
Glass shrimp	13	2.5	2.5	2.5	-	-
Primno	3	2.0	2.0	2.0	-	-
Boltenia	1	2.0	2.0	2.0	-	-
Soft sea cucumber	19	1.8	1.3	0.9	-	-
Cushion star	4	1.5	0.9	0.4	-	-
Bigfin eelpout	6	1.4	0.5	0.3	0.2	0.55
Prowfish	1	1.3	1.3	1.3	0.2	0.96
Basket star	7	1.1	0.3	0.3	-	-
Gorgonian corals	1	0.9	0.9	0.9	-	-
Pteraster marsippus	1	0.9	0.9	0.9	-	-
Starfish	10	0.8	0.8	0.4	-	-
Tunicata	2	0.8	0.8	0.8	-	-
Hippasteria californica	3	0.7	0.4	0.2	-	-
Paralomis multispina	2	0.7	0.5	0.3	-	-
Octopus	2	0.6	0.5	0.3	-	-
Shining tubeshoulder	5	0.6	0.5	0.3	0.1	0.88
Flapjack devilfish	3	0.5	0.5	0.3	-	-
Octopodidae	2	0.5	0.5	0.5	-	-

Table 9. Continued

Species	Number of Tows	Catch Weight (kg) Total	Maximum	Mean	Biomass (tonnes)	Relative Error
Sea whip	6	0.4	0.2	0.1	-	-
Salp	50	0.4	0.2	0.1	-	-
Blacktail snailfish	4	0.4	0.3	0.2	0.1	0.84
Flathead sole	1	0.3	0.3	0.3	0.1	1.02
Alaska snailfish	1	0.3	0.3	0.3	0.3	0.93
Tanner crabs	1	0.3	0.3	0.3	-	-
Benthoctopus	1	0.3	0.3	0.3	-	-
Spotfin sculpin	5	0.3	0.3	0.1	0.0	0.92
Puget sound rockfish	1	0.3	0.3	0.3	0.0	1.01
Zoroaster evermanni	10	0.2	0.1	0.1	-	-
Highfin dragonfish	4	0.2	0.1	0.1	0.2	0.68
Triopha	1	0.2	0.2	0.2	-	-
Pacific viperfish	18	0.2	0.1	0.1	0.1	0.61
Pinpoint lampfish	5	0.2	0.2	0.1	0.2	0.89
Gastropods	2	0.2	0.2	0.2	-	-
Poraniopsis inflata	3	0.2	0.2	0.2	-	-
Poraniidae	1	0.2	0.2	0.2	-	-
Bigeye poacher	15	0.2	0.1	0.1	0.0	0.70
Oregoniinae	2	0.2	0.2	0.2	-	-
Northern ronquil	4	0.2	0.1	0.1	0.0	0.74
Pacific sardine	1	0.2	0.2	0.2	0.0	0.98
Fish-eating star	1	0.1	0.1	0.1	-	-
White barracudina	2	0.1	0.1	0.1	0.0	0.98
Pallid eelpout	3	0.1	0.1	0.1	0.0	0.99
Rathbunaster californicus	2	0.1	0.1	0.1	-	-
Pacific lamprey	2	0.1	0.1	0.1	0.0	0.71
Lophaster furcilliger	1	0.1	0.1	0.1	-	-
Cheiraster dawsoni	1	0.1	0.1	0.1	-	-
Tritonia	4	0.1	0.1	0.1	-	-
Lanternfish	4	0.1	0.1	0.1	0.0	0.93
Roughspine sculpin	1	0.1	0.1	0.1	0.0	0.98
Blacktip poacher	9	0.0	0.0	0.0	0.0	0.64
Spiny red sea star	3	0.0	0.0	0.0	-	-
Falcate snailfish	1	0.0	0.0	0.0	0.0	0.92
Henricia longispina	2	0.0	0.0	0.0	-	-
Tubeshoulders	2	0.0	0.0	0.0	-	-
Snipe eels	2	0.0	0.0	0.0	-	-
Mediaster tenellus	1	0.0	0.0	0.0	-	-
Northern lampfish	14	-	-	-	-	-
Nearchaster	11	-	-	-	-	-
Pink shrimp	9	-	-	-	-	-
Dana's bladed shrimp	8	-	-	-	-	-
Garnet lanternfish	8	-	-	-	-	-
Isopods	7	-	-	-	-	-
Pandalopsis	6	-	-	-	-	-
Humpback snailfish	6	-	-	-	-	-

Table 9. Continued

Species	Number of Tows	Catch Weight (kg) Total	Maximum	Mean	Biomass (tonnes)	Relative Error
California headlightfish	6	-	-	-	-	-
Deepsea smelts	5	-	-	-	-	-
Whitetail sculpin	5	-	-	-	-	-
Hippasteria	5	-	-	-	-	-
Henricia aspera	4	-	-	-	-	-
Stomphia	4	-	-	-	-	-
Smalldisk snailfish	4	-	-	-	-	-
Henricia	4	-	-	-	-	-
Crested bigscale	4	-	-	-	-	-
Ophiura	4	-	-	-	-	-
Blue lanternfish	4	-	-	-	-	-
Pandalid shrimp	3	-	-	-	-	-
Amphiophiura ponderosa	3	-	-	-	-	-
Florometra asperrima	3	-	-	-	-	-
Pacific blacksmelt	3	-	-	-	-	-
Anthozoa	3	-	-	-	-	-
Ophiacantha	3	-	-	-	-	-
Squat lobster	2	-	-	-	-	-
Pacific bobtail squid	2	-	-	-	-	-
Solaster paxillatus	2	-	-	-	-	-
Snailfishes	2	-	-	-	-	-
Stegocephalidae	2	-	-	-	-	-
Eelpout	2	-	-	-	-	-
Eualus	2	-	-	-	-	-
Aphroditidae	2	-	-	-	-	-
Bluethroat argentine	2	-	-	-	-	-
Shrimp	2	-	-	-	-	-
Box crabs	2	-	-	-	-	-
Cookie star	2	-	-	-	-	-
Stout blacksmelt	2	-	-	-	-	-
Metridium	1	-	-	-	-	-
Oregontriton	1	-	-	-	-	-
Dipsacaster anoplus	1	-	-	-	-	-
Tadpole snailfish	1	-	-	-	-	-
Bryozoa	1	-	-	-	-	-
Vermillion starfish	1	-	-	-	-	-
Eelpouts	1	-	-	-	-	-
Amphiophiura superba	1	-	-	-	-	-
Sea pen	1	-	-	-	-	-
Pteraster jordani	1	-	-	-	-	-
Northern sculpin	1	-	-	-	-	-
Large eyed eualid	1	-	-	-	-	-
Stylatula elongata	1	-	-	-	-	-
Zoantharia	1	-	-	-	-	-
Mud star	1	-	-	-	-	-
Northern pearleye	1	-	-	-	-	-

Table 9. Continued

Species	Number of Tows	Catch Weight (kg) Total	Maximum	Mean	Biomass (tonnes)	Relative Error
Gnathophausia ingens	1	-	-	-	-	-
Bigeye flashlightfish	1	-	-	-	-	-
Peanutworms	1	-	-	-	-	-
Thornback sculpin	1	-	-	-	-	-
Long-armed sea star	1	-	-	-	-	-
Hyale	1	-	-	-	-	-
Threadfin sculpin	1	-	-	-	-	-
Robust clubhook squid	1	-	-	-	-	-
Polychaete worms	1	-	-	-	-	-
Pygmy snailfish	1	-	-	-	-	-
Northern crangon	1	-	-	-	-	-
Ophiurida	1	-	-	-	-	-
Solasteridae	1	-	-	-	-	-
Sea cucumbers	1	-	-	-	-	-
Neptunea	1	-	-	-	-	-
Acanthasteridae	1	-	-	-	-	-
Ophiura sarsi	1	-	-	-	-	-
Ceramaster clarki	1	-	-	-	-	-
Ceramaster japonicus	1	-	-	-	-	-
Longfin dragonfish	1	-	-	-	-	-
Deepsea spinyhead	1	-	-	-	-	-
Solaster hypothrissus	1	-	-	-	-	-
Notostomus	1	-	-	-	-	-
Zoroasteridae	1	-	-	-	-	-
Pink shrimp (smooth)	1	-	-	-	-	-
Ampheraster marianus	1	-	-	-	-	-
Chirostylidae	1	-	-	-	-	-

Table 10. Offloaded catch weight by species.

Species	Weight (kg)
Aurora Rockfish	0.9
Bocaccio	68.0
Canary Rockfish	25.9
Darkblotched Rockfish	356.1
Dover Sole	980.2
Dusky Rockfish	19.5
English Sole	16.8
Flathead Sole	40.4
Greenstriped Rockfish	0.9
Harlequin Rockfish	18.1
Lingcod	130.2
Pacific Cod	29.5
Pacific Ocean Perch	45,861.8
Redbanded Rockfish	604.2
Redstripe Rockfish	3,852.4
Rosethorn Rockfish	63.5
Rougheye Rockfish	17,576.7
Sablefish	634.1
Sharpchin Rockfish	6,626.5
Shortraker Rockfish	484.0
Shortspine Thornyhead	2,475.3
Silvergray Rockfish	10,197.2
Splitnose Rockfish	5.0
Widow Rockfish	871.8
Yelloweye Rockfish	3.2
Yellowmouth Rockfish	2,136.0
Yellowtail Rockfish	16.8
Total	**93,094.8**

Table 11. Number of samples and number of recorded biological attributes per species sampled.

Species	Samples	Lengths	Weights	Sexes	Maturities	Ages
Aleutian skate	7	7	7	7	0	0
Arrowtooth flounder	29	1,016	492	1,016	490	307
Aurora rockfish	3	33	1	33	0	0
Black eelpout	2	21	0	11	0	0
Blackfin sculpin	6	120	0	120	0	0
Bocaccio	12	18	18	18	18	18
Brown cat shark	5	7	7	7	0	0
Chum salmon	5	5	5	5	0	0
Darkblotched rockfish	12	107	96	107	95	95
Dover sole	21	834	512	834	512	330
Dusky rockfish	2	17	5	17	0	0
English sole	2	45	0	45	0	0
Giant grenadier	4	50	18	50	0	0
Greenstriped rockfish	7	203	0	203	0	0
Harlequin rockfish	4	107	0	107	0	0
Lingcod	21	43	41	43	11	11
Longnose skate	43	72	70	72	0	0
Longspine thornyhead	13	787	662	787	509	316
Pacific cod	18	61	61	61	43	31
Pacific flatnose	3	68	0	68	0	0
Pacific grenadier	7	302	168	302	105	43
Pacific hake	19	660	372	660	179	293
Pacific halibut	24	30	30	3	0	0
Pacific ocean perch	60	2,950	1,825	2,950	1,772	748
Petrale sole	17	99	79	98	71	71
Popeye	4	184	0	184	0	0
Puget sound rockfish	1	8	0	0	0	0
Pygmy rockfish	2	78	0	14	0	0
Redbanded rockfish	67	597	532	596	521	521
Redstripe rockfish	24	799	495	799	495	328
Rex sole	31	1,149	218	1,149	152	79
Rosethorn rockfish	22	709	92	708	92	0
Rougheye rockfish	40	1,569	1,465	1,569	1,349	784
Roughtail skate	7	22	12	22	0	0
Sablefish	39	856	715	852	634	521
Sandpaper skate	10	13	13	12	0	0
Sharpchin rockfish	27	1,143	674	1,143	632	372
Shortraker rockfish	23	149	149	149	149	149
Shortspine thornyhead	56	2,671	1,246	2,671	1,192	653
Silvergray rockfish	40	1,250	776	1,250	681	380
Slender sole	1	9	0	9	0	0
Splitnose rockfish	4	136	0	30	0	0
Spotted ratfish	8	273	0	273	0	0
Walleye pollock	7	228	0	228	0	0
Widow rockfish	5	151	96	151	43	0
Yelloweye rockfish	6	19	19	19	19	19
Yellowmouth rockfish	14	413	230	346	230	171
Yellowtail rockfish	1	10	10	10	0	0
Total	**785**	**20,098**	**11,211**	**19,808**	**9,994**	**6,240**

Table 12. Numbers of samples (N) and specimens (n) by sample type and species.

Species	Total		Len./Sex		Len./Sex/Wt.		Len./Sex/Wt./Age	
	N	n	N	n	N	n	N	n
Aleutian skate	7	7	0	0	7	7	0	0
Arrowtooth flounder	29	1,016	19	524	4	185	6	307
Aurora rockfish	3	33	2	32	1	1	0	0
Black eelpout	2	21	2	21	0	0	0	0
Blackfin sculpin	6	120	6	120	0	0	0	0
Bocaccio	12	18	0	0	0	0	12	18
Brown cat shark	5	7	0	0	5	7	0	0
Chum salmon	5	5	0	0	5	5	0	0
Darkblotched rockfish	12	107	6	11	1	1	5	95
Dover sole	21	834	12	322	3	182	6	330
Dusky rockfish	2	17	1	12	1	5	0	0
English sole	2	45	2	45	0	0	0	0
Giant grenadier	4	50	2	32	2	18	0	0
Greenstriped rockfish	7	203	7	203	0	0	0	0
Harlequin rockfish	4	107	4	107	0	0	0	0
Lingcod	21	43	1	2	19	30	1	11
Longnose skate	43	72	2	2	41	70	0	0
Longspine thornyhead	13	787	3	125	5	346	5	316
Pacific cod	18	61	0	0	15	30	3	31
Pacific flatnose	3	68	3	68	0	0	0	0
Pacific grenadier	7	302	4	134	2	125	1	43
Pacific hake	19	660	10	288	2	79	6	293
Pacific halibut	24	30	0	0	2	3	0	0
Pacific ocean perch	60	2,950	26	1,125	20	1,077	14	748
Petrale sole	17	99	10	20	4	8	3	71
Popeye	4	184	4	184	0	0	0	0
Puget sound rockfish	1	8	1	8	0	0	0	0
Pygmy rockfish	2	78	2	78	0	0	0	0
Redbanded rockfish	67	597	23	65	5	11	39	521
Redstripe rockfish	24	799	14	304	3	167	7	328
Rex sole	31	1,149	26	931	3	139	2	79
Rosethorn rockfish	22	709	20	617	2	92	0	0
Rougheye rockfish	40	1,569	7	104	17	681	16	784
Roughtail skate	7	22	1	10	6	12	0	0
Sablefish	39	856	13	141	12	193	14	521
Sandpaper skate	10	13	0	0	9	12	0	0
Sharpchin rockfish	27	1,143	11	469	7	302	9	372
Shortraker rockfish	23	149	0	0	0	0	23	149
Shortspine thornyhead	56	2,671	32	1,425	12	593	12	653
Silvergray rockfish	40	1,250	21	474	11	397	8	380
Slender sole	1	9	1	9	0	0	0	0
Splitnose rockfish	4	136	4	136	0	0	0	0
Spotted ratfish	8	273	8	273	0	0	0	0
Walleye pollock	7	228	7	228	0	0	0	0
Widow rockfish	5	151	2	55	3	96	0	0
Yelloweye rockfish	6	19	0	0	0	0	6	19
Yellowmouth rockfish	14	413	7	183	3	59	4	171
Yellowtail rockfish	1	10	0	0	1	10	0	0
Total	**785**	**20,098**	**326**	**8,887**	**233**	**4,943**	**202**	**6,240**

Table 13. Statistics of individual length and weight, and sex proportion by species.

Species	Length (cm)			Weight (kg)			Sex Proportion	
	Min.	Max.	Mean	Min.	Max.	Mean	Male	Female
Aleutian skate	67	140	95	1.4	15.4	5.5	0.14	0.86
Arrowtooth flounder	14	84	48	0.0	3.7	1.2	0.30	0.70
Aurora rockfish	28	40	32	0.6	0.6	0.6	0.64	0.36
Black eelpout	23	35	29				0.24	0.29
Blackfin sculpin	6	23	16				0.36	0.64
Bocaccio	65	83	72	3.2	6.3	4.5	0.72	0.28
Brown cat shark	42	69	57	0.3	1.0	0.7	0.57	0.43
Chum salmon	65	80	73	3.0	6.0	4.6	0.80	0.20
Darkblotched rockfish	32	52	41	0.6	2.4	1.3	0.42	0.58
Dover sole	26	56	39	0.2	1.8	0.6	0.81	0.19
Dusky rockfish	40	48	44	1.1	1.6	1.4	0.71	0.29
English sole	31	48	37				0.22	0.78
Giant grenadier	46	145	79	1.0	18.8	4.8	0.60	0.40
Greenstriped rockfish	17	36	26				0.65	0.35
Harlequin rockfish	16	31	23				0.44	0.56
Lingcod	61	115	91	1.9	12.3	7.1	0.00	1.00
Longnose skate	52	139	99	0.8	18.2	6.5	0.28	0.72
Longspine thornyhead	6	32	20	0.0	0.4	0.1	0.50	0.50
Pacific cod	36	73	53	0.5	4.0	1.7	0.50	0.50
Pacific flatnose	14	60	39				0.56	0.44
Pacific grenadier	11	74	47	0.1	1.8	0.7	0.72	0.28
Pacific hake	41	67	50	0.6	2.1	0.9	0.38	0.62
Pacific halibut	56	139	81	1.8	31.6	7.3	0.00	0.04
Pacific ocean perch	14	100	38	0.1	1.8	0.9	0.57	0.43
Petrale sole	32	400	56	0.3	1.2	0.7	0.79	0.20
Popeye	15	57	42				0.47	0.53
Puget sound rockfish	13	17	15				0.00	0.00
Pygmy rockfish	10	18	14				0.04	0.14
Redbanded rockfish	12	375	41	0.0	4.3	1.1	0.54	0.46
Redstripe rockfish	20	44	35	0.1	1.0	0.6	0.43	0.57
Rex sole	19	44	32	0.1	0.4	0.2	0.63	0.37
Rosethorn rockfish	5	35	26	0.1	0.6	0.3	0.55	0.45
Rougheye rockfish	13	600	51	0.0	8.4	1.6	0.54	0.46
Roughtail skate	15	82	51	0.1	2.9	1.2	0.68	0.32
Sablefish	10	635	71	0.7	11.0	2.7	0.76	0.24
Sandpaper skate	53	65	59	0.9	1.7	1.3	0.38	0.54
Sharpchin rockfish	10	38	27	0.0	0.8	0.4	0.43	0.57
Shortraker rockfish	36	100	63	0.7	17.2	4.6	0.41	0.59
Shortspine thornyhead	11	75	27	0.0	5.5	0.4	0.53	0.47
Silvergray rockfish	38	555	53	0.7	5.0	1.9	0.51	0.49
Slender sole	21	27	25				0.00	1.00
Splitnose rockfish	7	20	14				0.13	0.10
Spotted ratfish	11	50	25				0.45	0.55
Walleye pollock	19	62	31				0.38	0.62
Widow rockfish	37	58	51	0.8	2.7	1.9	0.38	0.62
Yelloweye rockfish	34	67	55	0.7	5.5	3.4	0.68	0.32
Yellowmouth rockfish	12	55	42	0.6	2.7	1.8	0.43	0.40
Yellowtail rockfish	43	53	49	1.2	2.3	1.8	0.50	0.50

Table 14. Data collected from net sensors, showing the number of tows from which each data type was collected (total number of survey tows is 130).

Sensor	Attribute	Number of Tows	Number of Records
Global Positioning System (GPS)	Vessel Direction - Compass Bearing True North	127	308,042
	Vessel Position - Latitude	127	303,882
	Vessel Position - Longitude	127	303,882
	Vessel Speed Over Ground	127	308,042
NMFS Bottom Contact Sensor	Bottom Contact Sensor Tilt Angle	111	92,713
Scanmar CGM RX 400	Net Depth	58	68,228
	Trawl Net Doorspread	58	70,480
	Trawl Net Footrope To Headline Distance (Opening)	58	69,800
	Trawl Net Headrope To Bottom Distance	58	69,800
Seabird SBE 19*plus* Seacat Profiler	Dissolved Oxygen	70	42,572
	Net Depth	70	21,286
	Salinity At Net Depth	70	21,286
	Water Temperature At Net Depth	70	21,286
Seabird SBE 39 Temperature and Pressure Sensor	Net Depth	127	44,328
	Water Temperature At Net Depth	127	44,328

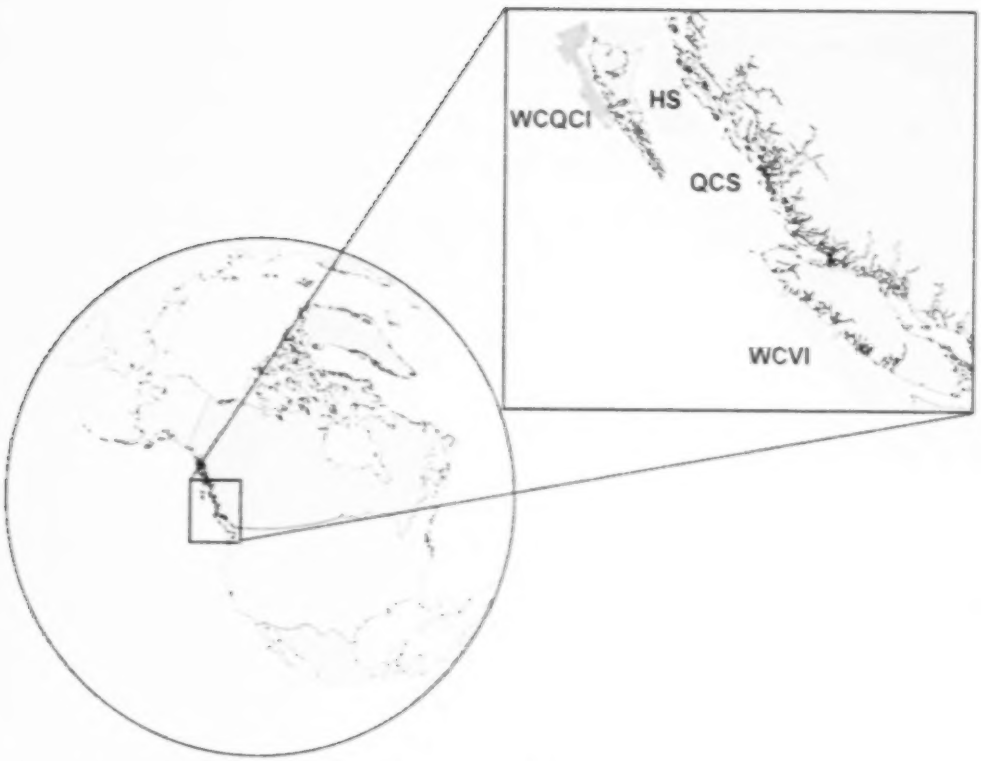

Figure 1. Locations of the current groundfish trawl surveys on the coast of British Columbia, Canada. WCQCI = west coast of Queen Charlotte Islands; HS = Hecate Strait; QCS = Queen Charlotte Sound; WCVI = west coast of Vancouver Island.

Figure 2. The commercial trawler F/V Frosti.

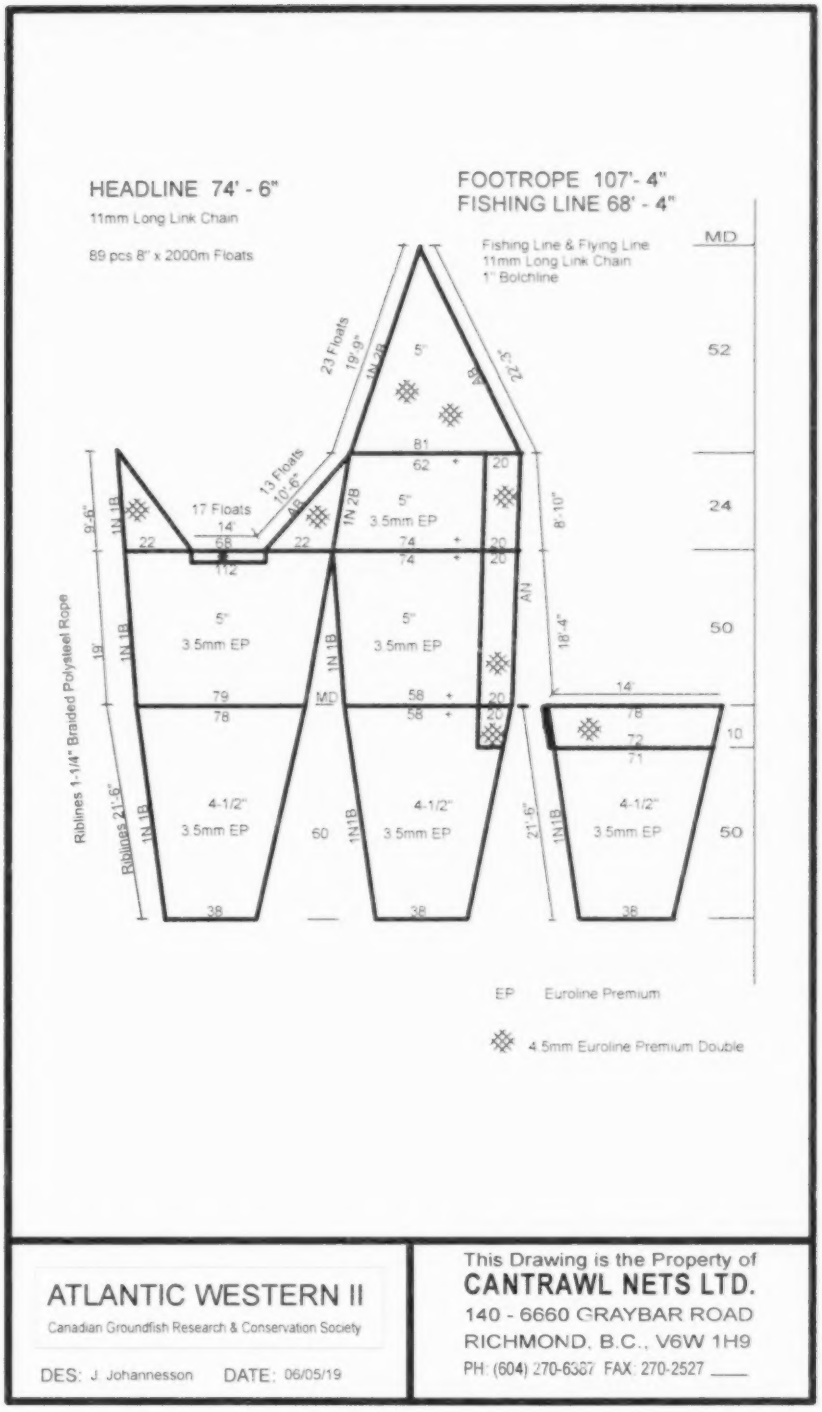

Figure 3: Net diagram provided by the manufacturer of the trawl net.

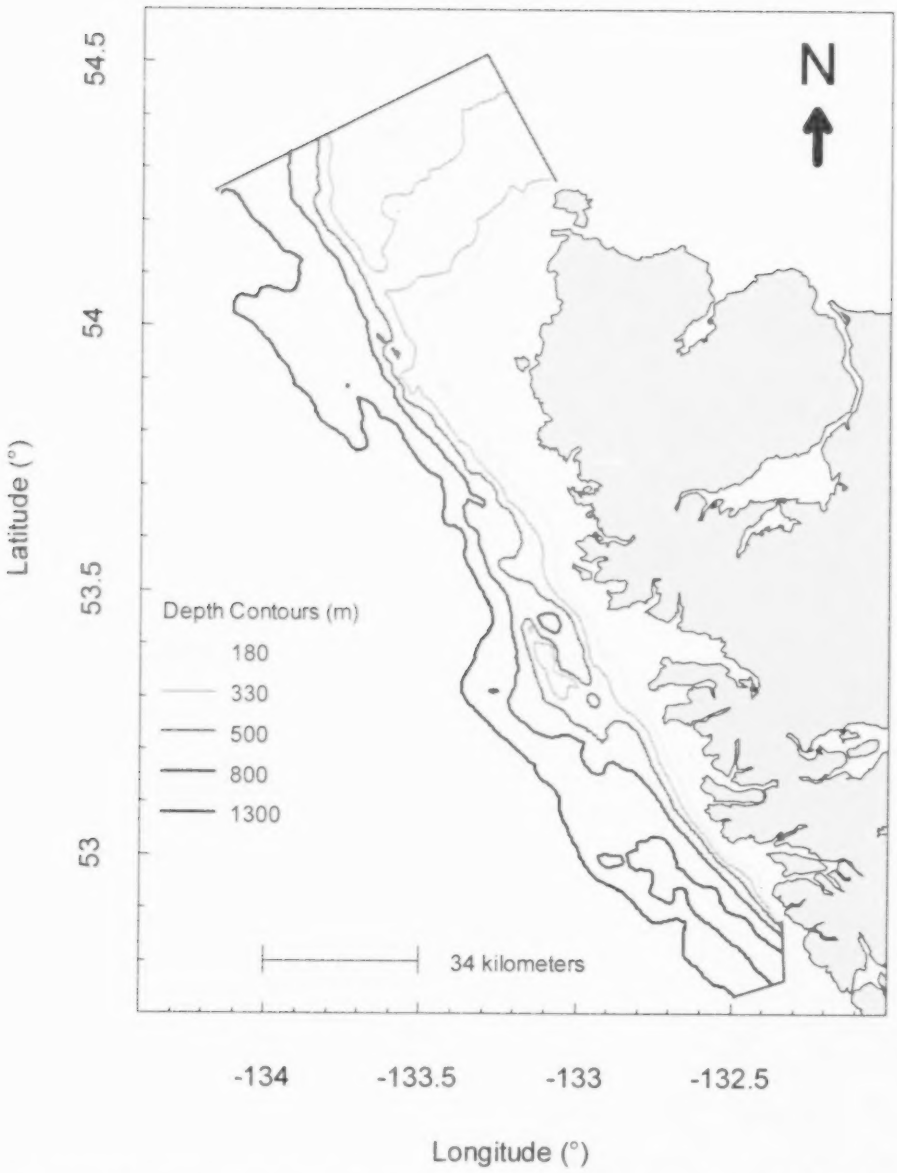

Figure 4. Queen Charlotte Islands study area showing the depth strata covered by the survey.

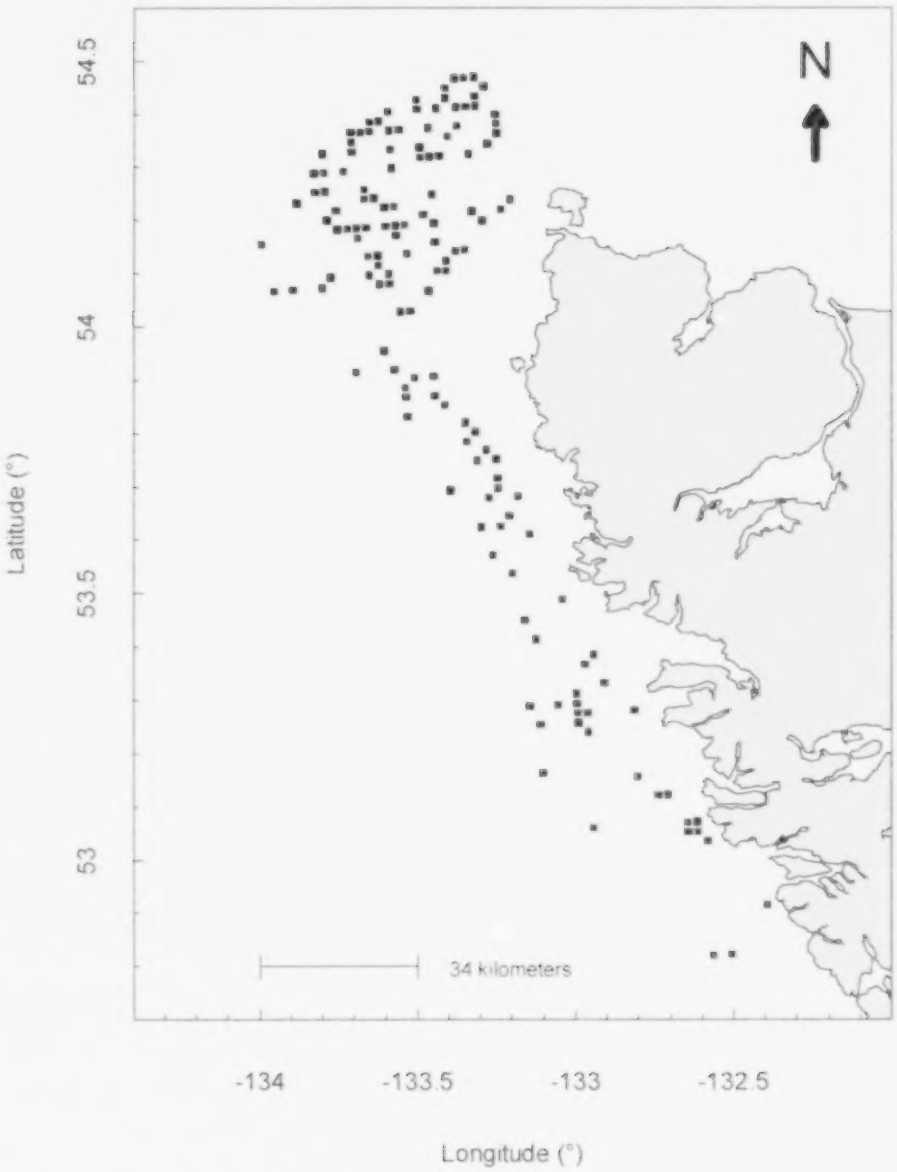

Figure 5. Initial status of the sampling frame showing the 145 randomly selected fishing locations.

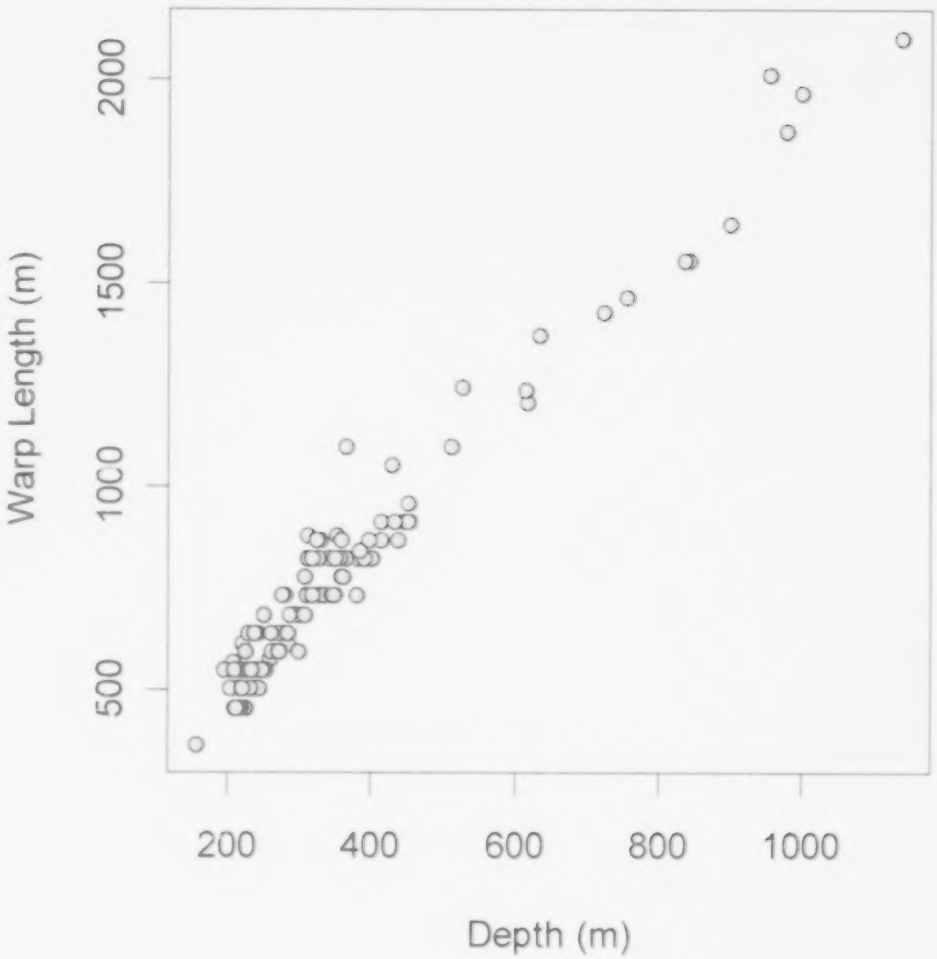

Figure 6. Warp length versus starting depth.

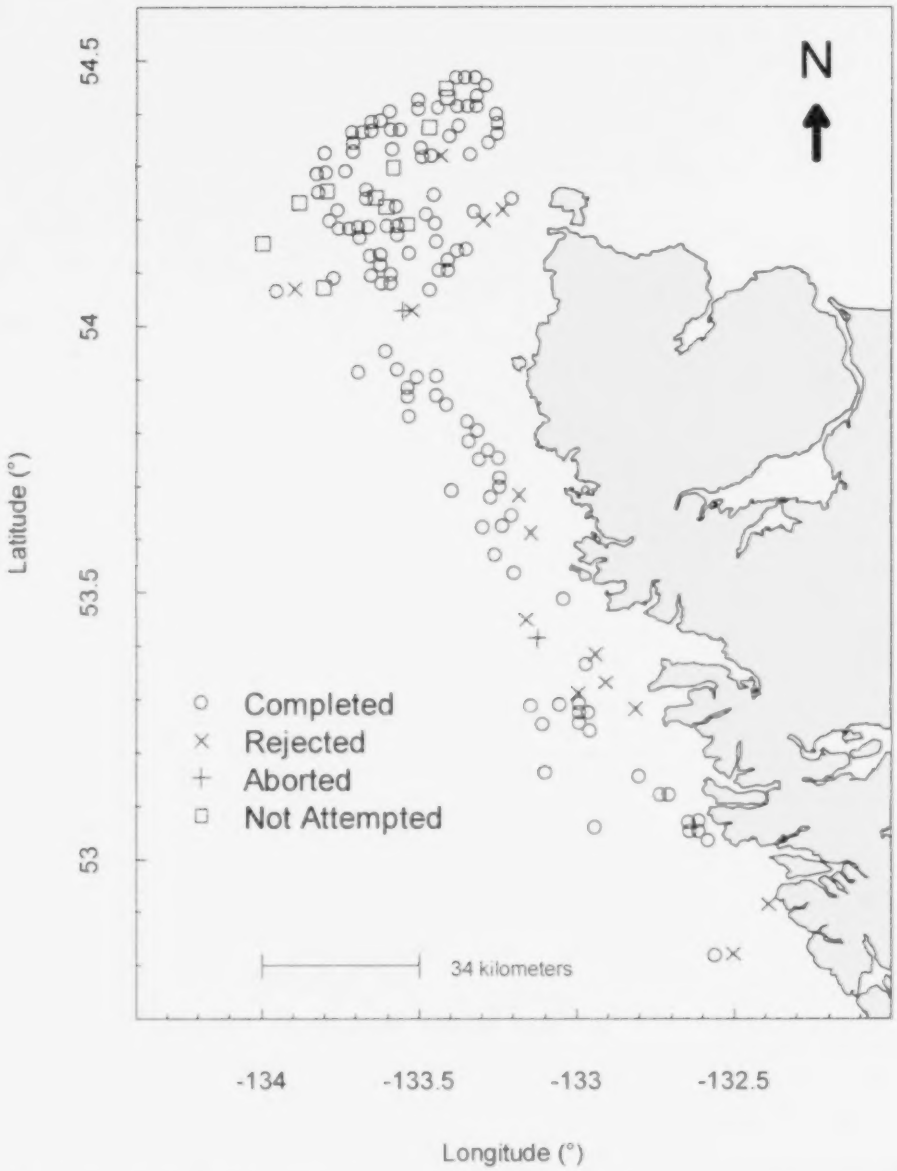

Figure 7. Final status of the sampling frame showing locations that were fished successfully (completed), rejected prior to fishing (rejected), abandoned after one or more unsuccessful fishing attempts (aborted), or not attempted.

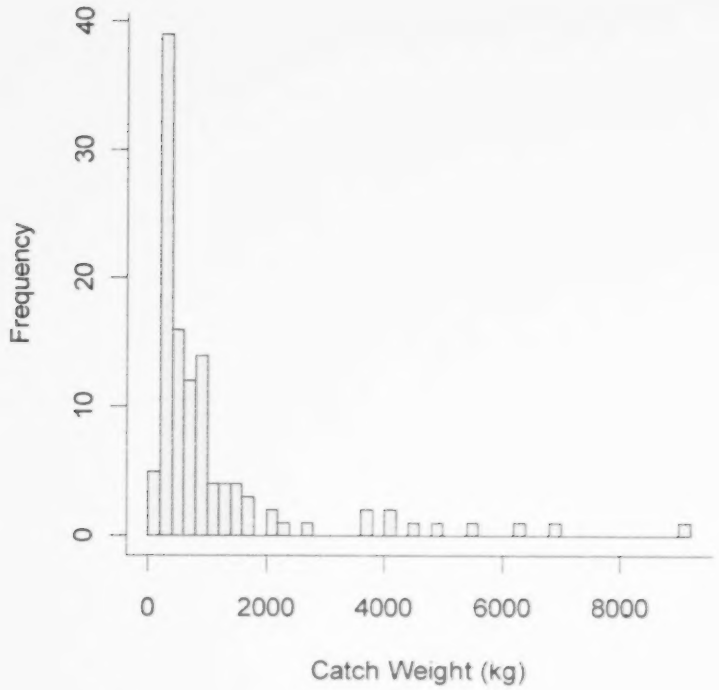

Figure 8. Histogram of catch weight per tow.

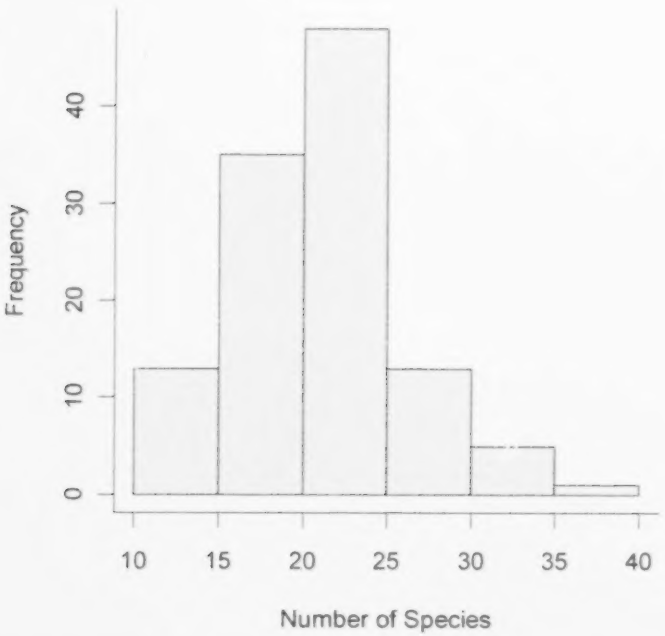

Figure 9. Histogram of number of species caught per tow.

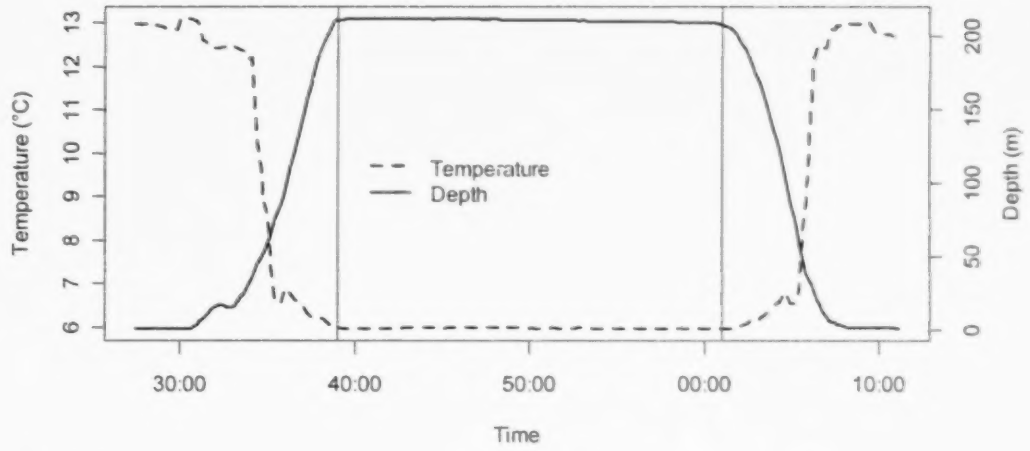

Figure 10. Seabird 39 temperature and depth profile from tow number 5. The vertical lines indicate the start and end of net contact with the sea floor.

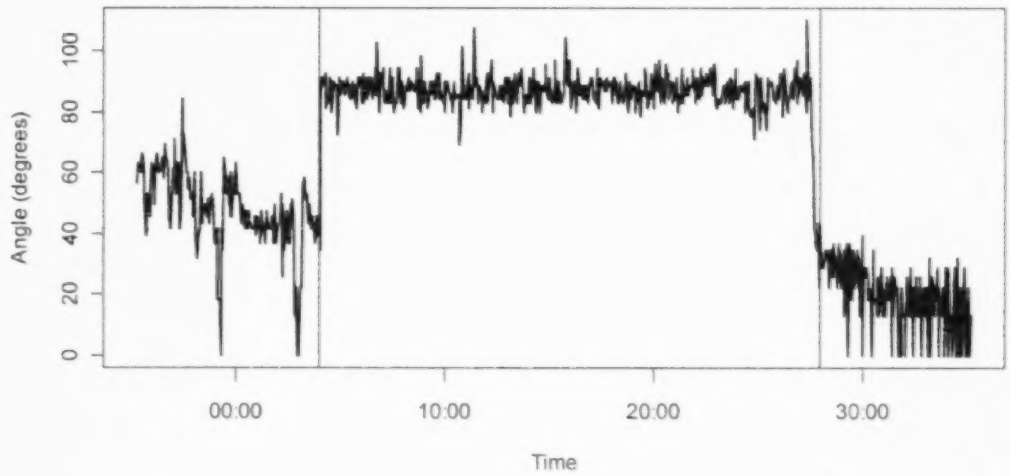

Figure 11. NMFS bottom contact sensor profile from tow number 1. The vertical lines indicate the start and end of net contact with the sea floor.

Species	2006	2007	2008
Arrowtooth flounder	612.0	966.8	1,143.9
Blackfin sculpin	9.9	6.9	5.5
Bocaccio	10.1	9.8	12.2
Chum salmon	9.1	6.1	3.0
Deepsea sole	10.0	6.6	4.3
Dover sole	371.3	568.6	472.7
English sole	5.3	3.1	5.3
Giant grenadier	339.0	28.6	360.5
Lingcod	42.8	56.1	58.8
Longnose skate	94.2	91.9	84.7
Longspine thornyhead	339.8	70.8	266.6
Pacific cod	56.8	40.6	15.2
Pacific flatnose	50.7	7.3	54.2
Pacific hake	1,004.1	863.7	817.7
Pacific halibut	49.2	54.3	45.3
Pacific ocean perch	9,913.9	8,665.2	8,371.4
Redbanded rockfish	87.0	85.6	107.0
Rex sole	195.6	240.7	196.2
Rosethorn rockfish	86.3	72.0	86.3
Rougheye rockfish	2,969.9	3,654.8	5,712.3
Sablefish	1,557.8	555.4	1,370.3
Sandpaper skate	7.1	15.6	3.8
Sharpchin rockfish	966.7	975.8	1,687.9
Shortraker rockfish	254.4	401.7	317.5
Shortspine thornyhead	1,173.7	1,339.8	1,137.8
Slender sole	3.9	1.6	1.7
Spiny dogfish	7.2	21.9	2.0
Spotted ratfish	32.1	51.0	93.2
Twoline eelpout	4.6	2.4	7.5
Walleye pollock	35.9	17.8	40.2

Figure 12. Relative biomass estimates of selected fish species from the first three years (2006 to 2008) of the west coast Queen Charlotte Islands survey. Species shown are those with relative errors less than 0.5 in all three years.

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APPENDIX A: BRIDGE LOG

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable?
1	Aug 28	06:45	52.8339	132.5455	-	29	-	-	10.0	No
2	Aug 28	12:17	52.8083	132.5438	980	37	4.5	1,875	178.0	Yes
3	Aug 28	16:48	53.0348	132.5873	210	19	5	549	309.8	Yes
4	Aug 28	18:11	53.0595	132.6205	218	19	5.1	549	607.6	Yes
5	Aug 28	19:33	53.0598	132.6128	203	19	4.9	503	234.5	Yes
6	Aug 28	20:41	53.0658	132.6340	225	20	5.1	594	342.6	Yes
7	Aug 29	06:54	53.1367	132.7193	615	37	5.3	1,234	575.9	Yes
8	Aug 29	09:10	53.1372	132.7402	635	36	5.1	1,372	233.6	Yes
9	Aug 29	11:30	53.1813	132.8053	725	37	4.6	1,427	211.9	Yes
10	Aug 29	13:28	53.0878	132.8922	1,141	37	4.6	2,103	373.3	Yes
11	Aug 29	16:40	53.1753	133.0973	1,268	22	4.6	-	-	No
12	Aug 30	06:40	53.1833	133.0980	955	36	4.1	2,012	301.7	Yes
13	Aug 30	10:03	53.3003	133.1378	526	37	4.7	1,244	167.4	Yes
14	Aug 30	11:56	53.2615	133.1212	646	36	4.8	-	186.0	Yes
15	Aug 30	14:00	53.2685	133.0133	384	19	4.8	841	993.8	Yes
16	Aug 30	15:53	53.2988	133.0725	337	19	5.1	-	559.8	Yes
17	Aug 30	17:28	53.2848	133.0022	221	19	4.7	613	924.0	Yes
18	Aug 30	19:41	53.3562	132.9762	618	19	4.5	1,207	303.3	Yes
19	Aug 31	06:50	53.4083	133.1360	204	10	4.7	549	518.4	No
20	Aug 31	09:24	53.4987	133.0502	207	19	5.6	567	229.9	Yes
21	Aug 31	11:29	53.5427	133.1875	511	18	4.7	1,097	212.9	Yes
22	Aug 31	13:04	53.5640	133.2438	284	19	5.3	613	135.1	Yes
23	Aug 31	14:37	53.6098	133.3075	330	19	5.7	869	1,018.5	Yes
24	Aug 31	16:28	53.6522	133.2063	341	19	4.9	823	805.5	Yes
25	Aug 31	18:38	53.7030	133.2427	216	19	5.2	503	449.7	Yes
26	Aug 31	20:03	53.7093	133.2487	218	19	5	503	398.4	Yes
27	Sep 1	07:02	54.0700	133.4785	195	19	5	549	1,457.9	Yes
28	Sep 1	08:26	54.0985	133.4097	229	19	6.1	640	637.0	Yes
29	Sep 1	10:12	54.0933	133.4558	312	20	6.1	823	604.1	Yes
30	Sep 1	11:41	54.1188	133.4112	312	19	6	878	-	Yes
31	Sep 1	13:13	54.1402	133.3913	352	19	5.3	878	698.4	Yes
32	Sep 1	14:49	54.1532	133.4380	382	18	5.2	823	406.7	Yes
33	Sep 3	07:21	54.3128	133.3395	449	19	5.2	914	320.7	Yes
34	Sep 3	09:03	54.3740	133.2495	437	19	5.3	869	384.4	Yes
35	Sep 3	10:28	54.4077	133.2365	379	20	4.9	732	393.9	Yes
36	Sep 3	12:06	54.4062	133.3277	338	20	5.4	732	392.9	Yes
37	Sep 3	13:37	54.4687	133.2653	267	19	5.3	594	322.1	Yes
38	Sep 3	15:09	54.4433	133.3025	299	20	5.3	594	481.2	Yes
39	Sep 3	16:41	54.4190	133.3387	-	20	5.4	686	306.9	Yes
40	Sep 3	18:01	54.4188	133.3788	292	19	5.1	686	493.8	Yes
41	Sep 3	19:43	54.4580	133.3970	273	20	4.9	594	279.8	Yes
42	Sep 4	07:04	54.4627	133.3320	278	19	4.8	640	359.2	Yes
43	Sep 4	08:22	54.4728	133.3532	272	19	5	640	256.2	Yes

Appendix A continued.

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable?
44	Sep 4	10:03	54.4185	133.4465	258	19	4.9	576	422.4	Yes
45	Sep 4	11:27	54.3903	133.3707	316	20	5.2	823	318.2	Yes
46	Sep 4	12:46	54.3690	133.3975	238	29	5.1	549	1,660.7	Yes
47	Sep 4	14:52	54.3227	133.4673	241	18	5	640	4,861.6	Yes
48	Sep 4	17:18	54.3455	133.4832	238	19	5.2	640	754.5	Yes
49	Sep 4	18:44	54.3133	133.4722	251	19	5.5	686	3,782.2	Yes
50	Sep 5	06:53	54.2068	133.4493	390	19	5.3	823	227.7	Yes
51	Sep 5	08:07	54.1948	133.4838	366	20	5.3	823	338.0	Yes
52	Sep 5	09:26	54.2403	133.4597	398	19	5.3	869	305.7	Yes
53	Sep 5	10:58	54.1930	133.5890	326	19	5.3	823	425.2	Yes
54	Sep 5	12:13	54.1472	133.5287	359	19	4.9	869	803.8	Yes
55	Sep 5	13:46	54.1132	133.5707	356	13	5	823	422.2	No
56	Sep 5	14:58	54.0970	133.5995	356	19	5.3	823	1,265.8	Yes
57	Sep 5	16:45	54.0857	133.6623	319	18	5.3	823	4,197.4	Yes
58	Sep 5	18:43	54.0775	133.5712	350	19	5.2	823	2,788.2	Yes
59	Sep 6	07:56	54.0603	133.9403	-	36	4.3	2,012	335.5	Yes
60	Sep 6	10:46	54.0727	133.7715	901	36	4.9	1,646	345.7	Yes
61	Sep 6	13:17	54.1253	133.6283	348	19	5	732	1,085.0	Yes
62	Sep 6	14:58	54.1488	133.6057	347	19	5.2	732	442.7	Yes
63	Sep 6	16:17	54.1468	133.6538	308	19	5.1	777	1,248.3	Yes
64	Sep 6	17:57	54.1932	133.7310	237	20	5.1	549	9,072.0	Yes
65	Sep 7	07:06	54.2990	133.7235	252	20	5.2	549	845.6	Yes
66	Sep 7	08:40	54.3023	133.7835	239	20	5.1	549	5,443.0	Yes
67	Sep 7	10:40	54.3072	133.8315	414	20	5.7	914	684.1	Yes
68	Sep 7	12:16	54.2495	133.8220	433	19	5.3	914	970.5	Yes
69	Sep 7	14:30	54.3373	133.8108	325	20	5.3	869	1,325.8	Yes
70	Sep 9	18:36	54.4257	133.4948	234	20	4.9	549	2,036.0	Yes
71	Sep 9	19:59	54.3972	133.5102	243	20	5.1	549	997.5	Yes
72	Sep 10	07:22	54.4083	133.5895	217	14	4.8	457	399.1	No
73	Sep 10	13:19	54.4102	133.5842	215	20	5.3	457	308.0	Yes
74	Sep 10	14:28	54.3763	133.6083	213	20	5.1	457	210.2	Yes
75	Sep 10	15:36	54.3817	133.5902	211	20	5.2	457	1,480.8	Yes
76	Sep 10	17:29	54.3780	133.6340	213	20	5.4	457	268.8	Yes
77	Sep 10	18:34	54.3727	133.6927	220	19	5.4	503	601.3	Yes
78	Sep 10	19:44	54.3590	133.6913	230	20	5.1	549	685.2	Yes
79	Sep 11	07:13	54.3197	133.7242	248	20	5	549	269.5	Yes
80	Sep 11	08:25	54.3540	133.6980	233	19	5.2	549	472.2	Yes
81	Sep 11	10:04	54.2490	133.6558	275	7	5.3	732	-	No
82	Sep 11	10:59	54.2287	133.6530	284	19	4.8	640	801.7	Yes
83	Sep 11	12:24	54.1772	133.6527	296	20	4.8	686	1,436.5	Yes
84	Sep 11	13:52	54.1585	133.6753	287	19	4.9	686	1,369.5	Yes
85	Sep 11	15:19	54.1812	133.6800	262	5	4.7	640	-	No
86	Sep 11	16:13	54.1965	133.6777	272	20	5.1	594	1,793.4	Yes

Appendix A continued.

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable?
87	Sep 11	17:51	54.1855	133.7603	307	20	5.1	686	6,350.0	Yes
88	Sep 12	07:24	54.1902	133.7667	326	20	5.2	732	3,629.0	Yes
89	Sep 12	10:23	53.9383	133.5790	366	37	5	1,097	6,804.0	Yes
90	Sep 12	12:40	53.8977	133.6588	1,000	36	4.8	1,966	400.6	Yes
91	Sep 12	15:05	53.9215	133.5597	338	19	4.9	732	4,536.0	Yes
92	Sep 12	16:37	53.8903	133.5003	336	20	5.1	732	891.7	Yes
93	Sep 12	17:58	53.8925	133.5493	280	19	5	732	2,117.4	Yes
94	Sep 12	19:33	53.8808	133.5643	304	19	5.1	686	4,536.0	Yes
95	Sep 13	07:14	54.0363	133.5688	221	2	3.5	503	-	No
96	Sep 13	08:13	54.0760	133.6187	351	19	5.5	732	4,082.0	Yes
97	Sep 13	09:57	54.1455	133.3580	307	19	5.5	686	678.4	Yes
98	Sep 13	11:22	54.2352	133.3347	452	19	5.2	960	1,192.9	Yes
99	Sep 13	13:04	54.2482	133.2042	240	20	5.3	503	1,419.8	Yes
100	Sep 13	14:31	54.3355	133.2772	455	19	5.4	914	564.7	Yes
101	Sep 13	15:51	54.3515	133.2447	452	20	5.4	914	480.9	Yes
102	Sep 15	12:55	54.3622	133.5553	245	19	5.4	503	2,385.3	Yes
103	Sep 15	14:56	54.3587	133.6705	236	19	5.1	549	633.3	Yes
104	Sep 15	16:15	54.3242	133.6022	262	20	5	594	655.9	Yes
105	Sep 15	17:50	54.2497	133.6590	272	19	5.4	640	930.8	Yes
106	Sep 15	19:15	54.2165	133.7452	232	20	5.1	549	1,641.9	Yes
107	Sep 16	07:14	54.2202	133.5820	318	20	5.1	732	246.0	Yes
108	Sep 16	08:25	54.1883	133.5557	358	20	5.4	777	331.4	Yes
109	Sep 16	09:52	54.1770	133.5542	360	21	6	777	364.8	Yes
110	Sep 16	12:40	53.9118	133.4527	199	20	5.1	-	313.4	Yes
111	Sep 16	13:51	53.8605	133.4308	232	19	5.2	503	287.2	Yes
112	Sep 16	14:58	53.8417	133.4083	236	19	5.3	-	441.6	Yes
113	Sep 16	16:28	53.8460	133.5432	757	37	4.8	1,463	234.0	Yes
114	Sep 16	18:28	53.8237	133.3572	216	5	4.6	503	-	No
115	Sep 16	18:51	53.8165	133.3493	218	15	5.1	457	250.8	Yes
116	Sep 17	07:19	53.7913	133.3217	225	19	5	457	591.3	Yes
117	Sep 17	08:42	53.7767	133.3388	260	19	5	594	454.7	Yes
118	Sep 17	10:02	53.7570	133.2835	219	20	5.2	457	300.6	Yes
119	Sep 17	11:28	53.7467	133.2350	157	20	4.8	366	165.7	Yes
120	Sep 17	12:44	53.7422	133.2943	245	19	5.3	549	337.4	Yes
121	Sep 17	13:55	53.6915	133.2715	428	37	4.8	1,052	955.2	Yes
122	Sep 17	16:30	53.6688	133.3798	836	37	5.2	1,555	176.6	Yes
123	Sep 17	18:33	53.6440	133.2670	843	37	5.1	1,555	182.9	Yes
124	Sep 18	07:33	53.2800	132.9743	302	19	5.2	-	981.2	Yes
125	Sep 18	09:11	53.2765	133.0140	309	20	5.2	732	853.7	Yes
126	Sep 18	10:37	53.2512	132.9753	415	20	5.1	869	1,154.2	Yes
127	Sep 18	14:43	53.0627	132.6437	401	19	5.2	823	900.1	Yes

APPENDIX B: CATCH BY TOW

Species	1	2	3	4	5	6	7	8	9	10
Aleutian skate								3.80		
Arrowtooth flounder			40.26	30.28	47.05	78.62	80.65	4.69		
Aurora rockfish										
Bigmouth sculpin										
Blackfin sculpin	0.36									
Bocaccio				4.20		3.90				
Canary rockfish			3.91	6.64						
Darkblotched rockfish										
Deepsea sole								0.87		
Dover sole			0.27	1.38	1.62		31.76	27.51	16.33	
Dusky rockfish										
English sole					0.62					
Giant grenadier	1.34	15.62					81.60	17.30	13.77	63.16
Greenstriped rockfish			2.23	1.40	8.88					
Harlequin rockfish	0.09		0.11		0.23	0.09				
Lingcod				6.42						
Longnose skate			10.68				3.81	4.29		
Longspine thornyhead		22.29					10.62	24.52	24.43	35.34
Pacific cod					1.49					
Pacific flatnose		0.34					3.04	1.82	3.06	12.53
Pacific grenadier	0.55	14.40					0.98	1.77	2.44	99.23
Pacific hake						34.38	6.20	0.70		
Pacific halibut					4.43		21.26			
Pacific ocean perch			64.07	20.30	7.00	164.03				
Petrale sole										
Popeye	0.15	3.12					3.42	2.47	9.95	18.77
Pygmy rockfish										
Ratfishes			11.84							
Redbanded rockfish						0.71				
Redstripe rockfish			15.11	18.64	3.18	0.56				
Rex sole			2.17	3.44	4.02	0.42	12.52	4.51	0.48	
Rosethorn rockfish			4.18		0.59					
Rougheye rockfish										
Roughtail skate		2.85							2.81	1.39
Sablefish	4.76	111.22			1.63	10.40	104.39	49.91	117.47	68.95
Sandpaper skate							1.59			
Sharpchin rockfish			11.77	0.56	1.16	2.87				
Shortraker rockfish							54.16			
Shortspine thornyhead	1.06	5.85	3.18	0.52		7.25	152.82	85.33	22.82	23.50
Silvergray rockfish			119.05	445.56	86.06	27.50				
Slender sole	0.16		0.06	0.10	0.31	0.05				
Spiny dogfish					1.30					
Splitnose rockfish			1.61	0.22	0.08	1.20				
Spotted ratfish				32.28	35.40	6.25				
Twoline eelpout		0.21					1.46	1.32	0.19	1.92
Walleye pollock			10.82	6.84	22.03	3.95				
Widow rockfish			7.82	8.09						
Yelloweye rockfish										
Yellowmouth rockfish				3.08						
Yellowtail rockfish				17.63	2.23					
Other	1.55	2.09	0.61		5.18	0.37	5.60	3.10	1.01	55.78
Total	10.02	177.99	309.75	607.58	234.49	342.55	575.88	233.91	214.76	380.57

Appendix B continued.

Species	11	12	13	14	15	16	17	18	19	20
Aleutian skate								2.39	4.56	
Arrowtooth flounder					1.62	0.55	2.57	63.96	8.27	49.05
Aurora rockfish			0.57							
Bigmouth sculpin										
Blackfin sculpin					0.20	0.83	1.93			
Bocaccio							6.20			
Canary rockfish										1.43
Darkblotched rockfish						1.56				
Deepsea sole		0.50	1.73	0.53				1.26		
Dover sole			18.77	18.47	16.56	24.85	0.47	66.74	5.99	1.14
Dusky rockfish										
English sole										0.80
Giant grenadier		18.20	2.27	2.67				28.02		
Greenstriped rockfish							2.60		19.51	3.16
Harlequin rockfish							3.44			0.20
Lingcod										12.02
Longnose skate					4.04			5.21		
Longspine thornyhead		19.29	41.43	42.51				5.04		
Pacific cod										3.13
Pacific flatnose		2.10	0.78	6.05				0.60		
Pacific grenadier		146.43	2.10	3.06						
Pacific hake			3.58		23.76	26.00	6.59	2.40		
Pacific halibut										
Pacific ocean perch					0.58	229.62	402.13	3.61	26.93	13.25
Petrale sole										1.29
Popeye		15.77		0.39						
Pygmy rockfish										
Ratfishes										
Redbanded rockfish						0.68	7.22		0.72	
Redstripe rockfish							2.71		142.12	11.16
Rex sole					3.70		0.48	3.80	3.40	3.00
Rosethorn rockfish						1.27	54.40		15.08	1.41
Rougheye rockfish			2.93		827.64	165.63	4.82	4.78		
Roughtail skate		4.40	0.10							
Sablefish		78.04	39.47	58.30	2.73	7.19		46.14		1.64
Sandpaper skate										
Sharpchin rockfish										1.22
Shortraker rockfish				8.00	81.28	4.90		14.12		
Shortspine thornyhead		14.10	52.69	41.93	31.68	92.45	3.93	52.86		2.22
Silvergray rockfish							67.28		197.52	96.08
Slender sole									0.70	
Spiny dogfish										
Splitnose rockfish										0.13
Spotted ratfish										2.42
Twoline eelpout		0.36		0.41						
Walleye pollock										20.94
Widow rockfish							270.17		17.24	
Yelloweye rockfish										
Yellowmouth rockfish							85.36		74.45	3.97
Yellowtail rockfish										
Other		2.53	0.98	445.65		4.26	1.72	2.32	2.58	0.21
Total		301.72	167.40	627.97	993.79	559.79	924.02	303.25	519.07	229.87

Appendix B continued.

Species	21	22	23	24	25	26	27	28	29	30
Aleutian skate	5.23									
Arrowtooth flounder	13.29	2.78	22.20	464.25	21.29	13.26	53.47	195.21	334.98	309.60
Aurora rockfish										
Bigmouth sculpin										
Blackfin sculpin		0.10	1.31	0.50	0.73	0.69			0.10	0.20
Bocaccio				4.15	4.66		10.38		11.04	
Canary rockfish						2.34	2.21			
Darkblotched rockfish		1.60								
Deepsea sole										
Dover sole	16.76		17.79	10.74	1.89	11.25	1.79	1.35	31.02	38.60
Dusky rockfish						0.48				
English sole						1.06	0.49	3.07	0.78	
Giant grenadier	2.82									
Greenstriped rockfish					2.59	5.37	41.55	0.70		
Harlequin rockfish			0.20		0.40	0.33	0.35	0.36		0.15
Lingcod				11.72	1.90					12.89
Longnose skate	3.14		4.81	3.77			8.69		8.56	
Longspine thornyhead	3.87									
Pacific cod						9.04	10.14	5.46		
Pacific flatnose	0.50									
Pacific grenadier										
Pacific hake			63.16	82.30	2.73	67.43	3.98			9.40
Pacific halibut				2.82		9.63	15.21	3.62		
Pacific ocean perch		474.03	577.77	27.51	3.86	3.71		25.25	90.94	69.77
Petrale sole							1.14			
Popeye										
Pygmy rockfish					0.21					
Ratfishes										
Redbanded rockfish			1.91	10.81	13.99	16.63		1.40	2.78	5.20
Redstripe rockfish	2.92				45.32	31.82		11.50		0.90
Rex sole	3.63	1.44	17.31	1.29	5.85	9.04	4.04	10.20	50.74	40.20
Rosethorn rockfish		5.32	10.99	2.59	4.47	2.27	1.11	0.42		0.40
Rougheye rockfish		380.80	74.98	58.70					0.08	3.95
Roughtail skate										
Sablefish	7.26		4.70	19.41		2.21				5.30
Sandpaper skate										
Sharpchin rockfish					18.80		1.75	1.23	1.30	
Shortraker rockfish	94.95	4.80	34.25	74.46						
Shortspine thornyhead	48.66	19.36	176.87	20.33	8.12	23.42			40.06	80.36
Silvergray rockfish	6.56	1.77	9.43		308.18	172.87	1273.06	358.91	19.15	4.00
Slender sole			0.42	0.15	0.09	0.64		0.40	0.10	0.15
Spiny dogfish										
Splitnose rockfish									0.77	
Spotted ratfish					0.31	0.58	5.23	7.51	2.31	1.80
Twoline eelpout										
Walleye pollock					1.22	0.17	1.21	5.76	1.60	
Widow rockfish						7.04	21.78		5.64	3.20
Yelloweye rockfish										
Yellowmouth rockfish		7.19								
Yellowtail rockfish						5.70				
Other	3.29		0.44		3.10	1.44	0.31	4.62	2.20	5.10
Total	212.88	901.07	1018.54	805.50	449.71	398.42	1457.89	636.97	604.15	591.17

Appendix B continued.

Species	31	32	33	34	35	36	37	38	39	40
Aleutian skate					1.44					
Arrowtooth flounder	296.61	52.15	11.86	19.37	14.62	29.44	16.98	26.78	32.62	26.45
Aurora rockfish										
Bigmouth sculpin						7.49				
Blackfin sculpin	0.10						0.74	0.38		
Bocaccio										
Canary rockfish										
Darkblotched rockfish						6.68				
Deepsea sole										
Dover sole	70.99	11.88	65.14	30.64	15.90	97.42	68.98	49.10	48.79	29.12
Dusky rockfish										
English sole										
Giant grenadier										
Greenstriped rockfish										
Harlequin rockfish		0.18					0.12			0.24
Lingcod							6.43			
Longnose skate	12.80		50.20	5.76	20.86	17.98	28.74			8.49
Longspine thornyhead										
Pacific cod										
Pacific flatnose										
Pacific grenadier										
Pacific hake	54.58	40.86	37.00	159.86	224.08	33.06	10.90	63.64	113.86	105.31
Pacific halibut	2.87		31.64							3.48
Pacific ocean perch	35.08	49.80			1.00	45.70	90.66	205.40	19.37	139.26
Petrale sole										
Popeye										
Pygmy rockfish										
Ratfishes										
Redbanded rockfish	0.98				2.20	6.30	6.30	11.52	9.83	6.99
Redstripe rockfish	1.20									
Rex sole	63.50	12.94	3.78	6.63	20.54	41.82	16.56	21.26	29.03	60.17
Rosethorn rockfish						0.26				
Rougheye rockfish	30.90	170.01	11.45	4.66	9.64	15.92	7.96	20.13	2.63	5.13
Roughtail skate										
Sablefish	13.29	4.52	66.20	122.84	21.60	2.14			3.23	4.14
Sandpaper skate	1.41				3.68					
Sharpchin rockfish	1.10					0.33	0.84		0.72	1.23
Shortraker rockfish								22.66		
Shortspine thornyhead	104.90	59.04	36.60	26.36	35.66	33.07	62.20	53.67	14.84	19.22
Silvergray rockfish	5.04	1.61						0.69	5.04	22.42
Slender sole										0.23
Spiny dogfish										
Splitnose rockfish										
Spotted ratfish	3.02	1.36	1.46	0.69	1.20	2.06		0.42	1.40	2.00
Twoline eelpout										
Walleye pollock					1.32	8.88	2.40	1.50	20.76	10.30
Widow rockfish										
Yelloweye rockfish										
Yellowmouth rockfish										
Yellowtail rockfish										
Other	0.06	2.39	5.38	7.62	20.11	49.67	2.32	4.08	4.74	49.62
Total	698.43	406.74	320.71	384.43	393.85	398.22	322.13	481.23	306.86	493.80

Appendix B continued.

Species	41	42	43	44	45	46	47	48	49	50
Aleutian skate										
Arrowtooth flounder	17.30	63.95	38.78	25.64	40.85	21.28	15.68	2.25	39.11	25.86
Aurora rockfish										
Bigmouth sculpin										
Blackfin sculpin		0.60	1.21		0.17	0.28	0.24			
Bocaccio										
Canary rockfish										
Darkblotched rockfish										
Deepsea sole										
Dover sole	44.58	57.53	37.42	7.15	40.53	0.36	1.84	1.21	9.09	7.84
Dusky rockfish							7.18			
English sole						0.56				
Giant grenadier										
Greenstriped rockfish										
Harlequin rockfish		0.20				0.20				
Lingcod		13.66				6.41	9.18			
Longnose skate						16.82				
Longspine thornyhead										
Pacific cod	2.22							2.42		
Pacific flatnose										
Pacific grenadier										
Pacific hake	35.40	18.07	36.39	3.10	0.78			0.89		32.14
Pacific halibut										
Pacific ocean perch	37.77	92.65	49.47	264.56	102.99	1362.65	2834.68	446.60	2167.71	40.98
Petrale sole										
Popeye										
Pygmy rockfish										
Ratfishes										
Redbanded rockfish	1.59	5.88	3.03	0.44	3.98	5.92	37.06	6.87	24.13	
Redstripe rockfish						12.26				
Rex sole	81.33	17.90	5.88	27.40	37.45	2.84	2.00	6.09	8.43	
Rosethorn rockfish	0.60		0.99	0.65	0.43	3.34	12.22	18.50	15.64	
Rougheye rockfish	5.33	6.92	3.05	2.36	3.92					48.02
Roughtail skate										
Sablefish	4.40		7.56							47.12
Sandpaper skate	2.68	1.04								
Sharpchin rockfish	0.03	0.15	0.53		0.50	23.24	585.00	185.50	146.59	
Shortraker rockfish										
Shortspine thornyhead	18.73	63.74	58.18	44.81	71.30	23.18	18.38	14.79	64.54	22.79
Silvergray rockfish	11.07	1.94	2.19	31.24	10.28	131.21	238.98	38.70	371.50	
Slender sole	0.15	0.10				0.08		0.21	0.29	
Spiny dogfish		3.39								
Splitnose rockfish										
Spotted ratfish	4.14	3.30	5.72	2.07	2.30	3.82	1.72			1.04
Twoline eelpout										
Walleye pollock	8.40	6.00	3.74	0.94		0.88		1.20	4.83	
Widow rockfish							61.38	4.20	418.92	
Yelloweye rockfish										
Yellowmouth rockfish						44.70	1032.30	23.38	511.43	
Yellowtail rockfish										
Other	4.10	2.18	2.10	12.01	2.91	0.66	3.74	1.70		1.89
Total	279.82	359.20	256.24	422.37	318.39	1660.69	4861.58	754.51	3782.21	227.68

Appendix B continued.

Species	51	52	53	54	55	56	57	58	59	60
Aleutian skate										
Arrowtooth flounder	26.46	16.14	64.32	23.26	35.84	42.08	24.96	22.29		
Aurora rockfish										
Bigmouth sculpin					6.27					
Blackfin sculpin			0.11			0.88	0.38	0.99		
Bocaccio										
Canary rockfish										
Darkblotched rockfish			2.13							
Deepsea sole										0.10
Dover sole	15.70		17.49	28.68	6.76	13.98	6.35	16.00		
Dusky rockfish										
English sole										
Giant grenadier									45.18	41.36
Greenstriped rockfish										
Harlequin rockfish				0.18	0.32	0.30				
Lingcod								5.74		
Longnose skate		14.77	2.34	17.68						
Longspine thornyhead									0.52	4.08
Pacific cod										
Pacific flatnose									23.93	
Pacific grenadier									183.40	12.68
Pacific hake	40.62	170.02	109.43	442.09	131.82	11.72		81.21		0.90
Pacific halibut			3.89							
Pacific ocean perch	56.18	6.60	151.56	117.36	93.63	662.74	3315.46	750.27		
Petrale sole										
Popeye									45.99	30.23
Pygmy rockfish										
Ratfishes										
Redbanded rockfish			1.11	5.02	1.30	0.32	10.29			
Redstripe rockfish										
Rex sole	2.92		9.97	25.76	17.46	4.88				
Rosethorn rockfish			1.49	0.90	0.24	4.90	23.67	7.72		
Rougheye rockfish	114.74	14.34	12.47	84.58	87.96	309.19	707.77	1613.74		
Roughtail skate									2.87	0.11
Sablefish	47.06	63.11	4.59	4.14		16.18	5.06	22.92	31.36	251.17
Sandpaper skate										
Sharpchin rockfish		0.08	0.62	0.88	0.40	0.18	1.91			
Shortraker rockfish			16.61				13.05			
Shortspine thornyhead	29.07	15.58	27.98	54.88	35.20	182.28	88.47	254.21	2.22	4.92
Silvergray rockfish				2.02		15.26		13.13		
Slender sole			0.20							
Spiny dogfish										
Splitnose rockfish						0.32				
Spotted ratfish	4.20					0.62				
Twoline eelpout										
Walleye pollock										
Widow rockfish										
Yelloweye rockfish										
Yellowmouth rockfish										
Yellowtail rockfish										
Other	1.02	5.04	1.36	2.66	4.98				0.50	6.20
Total	337.97	305.68	427.67	810.09	422.18	1265.83	4197.37	2788.22	335.97	351.75

Appendix B continued.

Species	61	62	63	64	65	66	67	68	69	70
Aleutian skate	5.43									
Arrowtooth flounder	118.50	32.64	109.35		17.46	9.90	57.66	103.80	105.66	17.57
Aurora rockfish								6.45		
Bigmouth sculpin										
Blackfin sculpin	2.44	2.28	3.14		2.18	0.20			1.72	0.14
Bocaccio										
Canary rockfish										
Darkblotched rockfish									14.70	
Deepsea sole										
Dover sole	17.74	7.78	13.87	11.29	2.58		27.46	57.17	26.48	2.68
Dusky rockfish					1.70					
English sole										
Giant grenadier										
Greenstriped rockfish										
Harlequin rockfish	0.58	0.43	0.42	48.82	0.56	55.42				
Lingcod	12.30			142.03						
Longnose skate	12.28	5.89					0.82	8.92	3.50	
Longspine thornyhead										
Pacific cod			3.27							6.52
Pacific flatnose										
Pacific grenadier										
Pacific hake	9.92	9.35	2.01				97.20	69.55	135.76	
Pacific halibut	6.37	9.95	3.12	27.01	9.45	17.84				
Pacific ocean perch	666.26	187.26	919.52	172.60	358.08	804.70		9.63	519.02	1354.37
Petrale sole				1.55						
Popeye										
Pygmy rockfish										
Ratfishes										
Redbanded rockfish	0.20	1.24	5.36	3.28	6.02	67.98	4.24	0.26	2.14	3.34
Redstripe rockfish				1189.75	1.06	1308.72				1.71
Rex sole	2.90	10.73	4.30		7.56	4.68	2.36	1.56	3.84	8.49
Rosethorn rockfish	16.18	10.01	32.61	4.51	12.78	17.23			6.20	
Rougheye rockfish	0.55	1.14					289.87	507.33	233.48	
Roughtail skate										
Sablefish	5.32	3.63	6.55		24.02		39.73	81.44	15.44	3.58
Sandpaper skate							1.22	0.92	1.16	
Sharpchin rockfish	2.04	1.17	1.73	5027.51	336.22	2739.58				131.73
Shortraker rockfish							33.39	22.68	37.18	
Shortspine thornyhead	176.36	153.46	78.78		23.67	4.88	127.30	92.03	116.08	3.94
Silvergray rockfish	18.30	2.05	28.94	2352.48	37.12	373.41				310.47
Slender sole		0.10			0.12					0.37
Spiny dogfish		2.04								
Splitnose rockfish			0.53					2.56		
Spotted ratfish	11.33	1.52	37.97	79.83	5.02	11.73		3.20	3.44	
Twoline eelpout										
Walleye pollock										0.14
Widow rockfish										
Yelloweye rockfish										
Yellowmouth rockfish				9.46		25.98				171.83
Yellowtail rockfish										
Other				1.82	1.94	0.67	2.86	3.22		19.15
Total	1085.00	442.67	1251.47	9071.94	847.54	5442.92	684.11	970.72	1225.80	2036.03

Appendix B continued.

Species	71	72	73	74	75	76	77	78	79	80
Aleutian skate										
Arrowtooth flounder	8.40	8.20	10.54	3.22	0.84	9.49	11.08	7.86	16.77	18.12
Aurora rockfish										
Bigmouth sculpin										
Blackfin sculpin	0.30								1.17	
Bocaccio										
Canary rockfish										
Darkblotched rockfish								5.34		
Deepsea sole										
Dover sole	0.67	1.17	0.36	0.32		0.47	0.94	1.62	6.52	1.54
Dusky rockfish			2.31							16.39
English sole										0.69
Giant grenadier										
Greenstriped rockfish		1.23	1.02	0.64	1.08	2.09	3.43	0.68		0.31
Harlequin rockfish		8.00	2.84	0.13	4.42	0.20	0.41			0.47
Lingcod					29.64				7.56	6.10
Longnose skate							20.01			
Longspine thornyhead										
Pacific cod	1.06	1.17				2.48	4.65			5.13
Pacific flatnose										
Pacific grenadier										
Pacific hake			8.63			0.91			6.92	1.94
Pacific halibut			6.10	8.58			18.48			
Pacific ocean perch	633.52	3.81			2.34	10.97	148.30	461.48	38.22	264.55
Petrale sole			1.60	2.40		0.53	1.90	0.88	1.20	1.90
Popeye										
Pygmy rockfish			0.52	0.38	0.44					
Ratfishes										
Redbanded rockfish	1.34	11.18	19.28	2.11	16.44	2.11	5.14	5.35	6.94	8.80
Redstripe rockfish	0.50	78.90	13.95	23.72	789.11	54.96	144.15	6.53	0.90	0.45
Rex sole	5.07	0.85	1.07	3.48	1.32	3.74	5.34	3.43	8.41	9.57
Rosethorn rockfish	4.54	8.86	9.68	6.10	4.66	0.73	2.82	2.52	2.91	2.68
Rougheye rockfish										
Roughtail skate										
Sablefish	2.60					11.72	8.22			
Sandpaper skate										
Sharpchin rockfish	47.02	125.11	24.59	33.58	510.72	53.81	71.70	134.01	117.27	92.96
Shortraker rockfish										
Shortspine thornyhead	7.13	0.80	0.56					1.69	26.39	4.55
Silvergray rockfish	218.46	121.10	164.60	75.12	62.11	95.73	119.36	34.56	17.74	20.44
Slender sole							0.10		0.81	
Spiny dogfish							1.59			
Splitnose rockfish										
Spotted ratfish	2.51	5.96	5.72	12.42	7.30	18.81	33.58	3.10	5.81	3.99
Twoline eelpout										
Walleye pollock	0.32									
Widow rockfish	1.85				1.86					2.05
Yelloweye rockfish		19.47	17.90	5.36	12.66					
Yellowmouth rockfish	57.66		16.77	31.78	62.48			21.51	2.02	1.89
Yellowtail rockfish										
Other	4.59	5.61		0.89	3.18		0.09		1.94	7.63
Total	997.54	401.42	308.04	210.23	1510.60	268.75	601.29	690.56	269.50	472.15

Appendix B continued.

Species	81	82	83	84	85	86	87	88	89	90
Aleutian skate										
Arrowtooth flounder		10.00	10.20	30.94		16.76	8.99	121.77	95.54	
Aurora rockfish									16.53	
Bigmouth sculpin										
Blackfin sculpin			0.99	0.67				3.62		
Bocaccio										
Canary rockfish										
Darkblotched rockfish							98.56	133.17		
Deepsea sole										0.25
Dover sole		4.25	3.94	4.20		2.12		127.50	129.42	0.44
Dusky rockfish										
English sole										
Giant grenadier									33.88	72.90
Greenstriped rockfish										
Harlequin rockfish		0.41	0.32	0.41		0.56				
Lingcod						6.90				
Longnose skate			2.99						23.72	
Longspine thornyhead										32.76
Pacific cod										
Pacific flatnose										1.07
Pacific grenadier										88.11
Pacific hake		1.06	1.13				18.61	16.76	97.31	
Pacific halibut				7.42				19.10		
Pacific ocean perch		671.84	1316.17	1063.35		1158.85	6179.67	2822.26	156.88	
Petrale sole						0.68				
Popeye										31.76
Pygmy rockfish										
Ratfishes										
Redbanded rockfish		4.27	2.00	8.00		9.38	8.75	4.42		
Redstripe rockfish				0.62						
Rex sole		8.32	4.92	2.30		4.64		3.21	20.87	
Rosethorn rockfish		16.77	17.89	46.80		16.17	9.30	28.09		
Rougheye rockfish							3.42	115.46	5656.53	
Roughtail skate										12.03
Sablefish								75.63	69.37	145.39
Sandpaper skate										
Sharpchin rockfish		56.71	2.31	110.84		530.81	8.32	34.73		
Shortraker rockfish									349.42	
Shortspine thornyhead		21.38	28.75	30.93		15.24	7.16	102.09	154.47	12.21
Silvergray rockfish		4.97	41.32	49.95		27.10				
Slender sole						0.08		0.03		
Spiny dogfish										
Splitnose rockfish								3.41		
Spotted ratfish		0.66	0.67	12.53		3.78	7.16	14.41		
Twoline eelpout										0.48
Walleye pollock										
Widow rockfish			2.05							
Yelloweye rockfish										
Yellowmouth rockfish										
Yellowtail rockfish										
Other		1.02	0.89	0.55		0.32		3.24	0.01	3.20
Total		801.66	1436.54	1369.51		1793.39	6349.94	3628.90	6803.95	400.60

Appendix B continued.

Species	91	92	93	94	95	96	97	98	99	100
Aleutian skate										
Arrowtooth flounder		47.24	64.78			72.86	368.41	128.92	822.33	50.92
Aurora rockfish										
Bigmouth sculpin										
Blackfin sculpin						0.04				
Bocaccio							3.18		4.40	
Canary rockfish							1.63			
Darkblotched rockfish	20.57	1.70	18.58	123.45						
Deepsea sole										
Dover sole	13.65	7.12	6.28			31.04	3.99	23.90		102.66
Dusky rockfish										
English sole							12.05		0.50	
Giant grenadier										
Greenstriped rockfish										
Harlequin rockfish				0.53						0.12
Lingcod							14.74		86.46	
Longnose skate							8.80	2.72	27.74	6.78
Longspine thornyhead								3.58		
Pacific cod									19.34	
Pacific flatnose										
Pacific grenadier										
Pacific hake	30.58	57.22	3.90			40.37		323.06	3.92	146.64
Pacific halibut										
Pacific ocean perch	2098.50	347.28	1268.87	3382.35		1671.92	94.14	21.06	2.20	
Petrale sole									5.36	
Popeye										
Pygmy rockfish										
Ratfishes										
Redbanded rockfish	6.15	15.73					16.47			
Redstripe rockfish							1.11			
Rex sole		3.26	4.12	1.22		1.60	21.60	8.66	0.52	6.50
Rosethorn rockfish	5.57	1.92	15.64	6.37		11.38	0.54			
Rougheye rockfish	2229.48	312.41	655.16	997.57		2048.01		430.58		88.42
Roughtail skate										
Sablefish		11.56				22.60		128.64		99.20
Sandpaper skate										
Sharpchin rockfish		0.42	31.06	2.67		12.06	0.83		0.40	
Shortraker rockfish		8.96								13.54
Shortspine thornyhead	92.51	69.72	44.14	8.16		127.07	10.33	115.30	3.10	25.11
Silvergray rockfish						24.61	99.97		339.77	6.62
Slender sole		0.86								
Spiny dogfish										
Splitnose rockfish		1.68	0.64	8.66						
Spotted ratfish	13.84		0.70	4.96		17.25	2.80	4.66	97.96	2.23
Twoline eelpout										
Walleye pollock	24.61	0.84					7.28		1.16	
Widow rockfish			1.46				9.17			
Yelloweye rockfish										
Yellowmouth rockfish										
Yellowtail rockfish									4.67	
Other	0.48	3.78	2.03			1.12	1.33	1.82		16.07
Total	4535.94	891.70	2117.36	4535.94		4081.93	678.37	1192.90	1419.83	564.81

Appendix B continued.

Species	101	102	103	104	105	106	107	108	109	110
Aleutian skate						15.40				
Arrowtooth flounder	54.40	11.56	11.61	9.22	18.20	5.56	12.83	20.44	46.39	46.20
Aurora rockfish										
Bigmouth sculpin										
Blackfin sculpin						1.40	0.49			
Bocaccio					5.98					
Canary rockfish										5.25
Darkblotched rockfish									2.16	
Deepsea sole										
Dover sole	126.40	0.24			2.08	1.98	12.98	45.93	46.68	
Dusky rockfish										
English sole										3.27
Giant grenadier	1.10									
Greenstriped rockfish			0.36							13.15
Harlequin rockfish					0.22	11.58	0.47			
Lingcod										11.84
Longnose skate	2.24							3.19	17.76	
Longspine thornyhead										
Pacific cod		2.48				5.80				18.08
Pacific flatnose										
Pacific grenadier										
Pacific hake	155.04				1.00		4.83	12.03	10.06	
Pacific halibut				3.35		6.51				
Pacific ocean perch		1887.73	412.68	527.64	810.70	237.46	126.77	171.43	132.29	
Petrale sole			2.34			0.86				6.31
Popeye										
Pygmy rockfish										
Ratfishes										
Redbanded rockfish		7.46	0.88	1.52	1.61	73.06	1.25	0.29	4.99	
Redstripe rockfish		3.02				10.60				106.03
Rex sole	18.85	1.02	7.60	4.06	4.04	7.36	14.20	14.30	13.96	39.08
Rosethorn rockfish		12.12	2.87	7.46	11.31	9.44	1.80			0.10
Rougheye rockfish	38.86						3.86	1.80	2.36	
Roughtail skate										
Sablefish	44.76		7.39			8.76	21.84	29.18	23.89	
Sandpaper skate	3.18								1.11	
Sharpchin rockfish		223.54	161.35	80.88	55.77	1032.18			0.40	2.05
Shortraker rockfish										
Shortspine thornyhead	21.16	14.08	0.93	9.06	13.52	10.28	42.54	27.05	56.34	
Silvergray rockfish		194.49	20.18	5.88	6.35	191.04				21.43
Slender sole		0.06				0.06		0.14	0.75	0.04
Spiny dogfish										3.74
Splitnose rockfish							0.37		0.32	
Spotted ratfish			2.57			9.00	0.44	3.02	3.36	0.77
Twoline eelpout										
Walleye pollock			0.38							27.53
Widow rockfish		2.48		4.13						3.33
Yelloweye rockfish										1.74
Yellowmouth rockfish		20.76	2.02	1.10		2.54				
Yellowtail rockfish										
Other	14.88	4.22	0.09	1.62		1.02	1.30	2.57	2.02	3.50
Total	480.87	2385.26	633.25	655.92	930.78	1641.89	245.97	331.37	364.84	313.44

Appendix B continued.

Species	111	112	113	114	115	116	117	118	119	120
Aleutian skate										
Arrowtooth flounder	53.92	30.50	2.13		19.12	22.32	17.77	81.25	0.46	23.52
Aurora rockfish										
Bigmouth sculpin										
Blackfin sculpin										
Bocaccio						12.30	11.14			
Canary rockfish						1.85				
Darkblotched rockfish										
Deepsea sole			1.20							
Dover sole	0.13	0.76	33.95		1.77	4.98	1.05	0.70		0.38
Dusky rockfish										
English sole	0.67	1.76			2.24	0.69	0.59	10.32	0.43	0.72
Giant grenadier			11.77							
Greenstriped rockfish	11.81	34.85			6.03	10.53	0.22	6.15	4.79	2.58
Harlequin rockfish		0.09			0.21	0.22	0.18			0.42
Lingcod							6.49	4.29	19.91	
Longnose skate	8.31	18.83				1.13		7.68		16.55
Longspine thornyhead			52.06							
Pacific cod	9.18	2.10				3.25				
Pacific flatnose			2.83							
Pacific grenadier			2.88							
Pacific hake										
Pacific halibut						9.14				13.16
Pacific ocean perch	1.02	2.29					10.28	6.93		10.56
Petrale sole		0.68							35.55	
Popeye			0.10							
Pygmy rockfish									34.90	1.90
Ratfishes										
Redbanded rockfish		3.61			11.40	38.03	92.32	0.78		58.12
Redstripe rockfish	13.35	20.70			138.73	363.76	10.66	10.92	2.24	
Rex sole	10.28	11.61	3.68		44.56	65.47	5.33	105.13	5.73	2.79
Rosethorn rockfish		0.26			7.45	2.22	1.11	0.34		
Rougheye rockfish										
Roughtail skate										
Sablefish		0.94	49.92					4.25		
Sandpaper skate										
Sharpchin rockfish	0.40	0.61				6.50	11.86		0.14	2.03
Shortraker rockfish										
Shortspine thornyhead			69.13			1.53	16.27	0.51		18.62
Silvergray rockfish	144.01	262.31			14.93	41.29	258.95	38.46	34.57	147.43
Slender sole	0.88	0.33			0.49	0.79		1.03		0.85
Spiny dogfish	3.30									
Splitnose rockfish	0.35						0.28			5.75
Spotted ratfish	8.83	9.45			0.18	3.70	1.73	3.82	5.30	5.32
Twoline eelpout			1.51							
Walleye pollock	19.53	16.69			0.93	1.23	5.26	9.17	10.67	11.75
Widow rockfish	0.74	21.53					1.76	1.62		
Yelloweye rockfish									8.42	
Yellowmouth rockfish					0.15				2.74	1.53
Yellowtail rockfish		1.65								6.31
Other	0.50	0.09	2.83		2.56	0.35	1.45	7.27	0.40	6.90
Total	287.21	441.64	233.99		250.75	591.28	454.70	300.62	166.25	337.19

Appendix B continued.

Species	121	122	123	124	125	126	127
Aleutian skate							
Arrowtooth flounder	281.87	1.43		1.00		28.48	158.83
Aurora rockfish	12.20						17.94
Bigmouth sculpin							
Blackfin sculpin				0.68	1.06		
Bocaccio							
Canary rockfish							
Darkblotched rockfish							
Deepsea sole	2.28	0.07					
Dover sole	43.86	5.14	1.49	13.00	20.03	29.04	14.90
Dusky rockfish							
English sole							
Giant grenadier		9.18	11.30				
Greenstriped rockfish							
Harlequin rockfish							
Lingcod							
Longnose skate	5.53						
Longspine thornyhead		33.55	29.30				
Pacific cod							
Pacific flatnose		2.77	1.10				
Pacific grenadier		10.17	6.42				
Pacific hake	115.87			1.95	85.30	15.80	145.35
Pacific halibut							
Pacific ocean perch				170.86	314.06	1.56	16.24
Petrale sole							
Popeye		39.41	10.49				
Pygmy rockfish							
Ratfishes							
Redbanded rockfish							14.06
Redstripe rockfish				0.65			
Rex sole	3.84			3.67	7.12	13.96	2.21
Rosethorn rockfish				8.45	1.23		
Rougheye rockfish	274.07			608.87	343.18	954.64	356.62
Roughtail skate							
Sablefish	75.20	53.84	57.04	10.52	7.98	13.38	68.61
Sandpaper skate							1.25
Sharpchin rockfish							
Shortraker rockfish	54.32	4.78		20.70		18.46	4.99
Shortspine thornyhead	47.90	12.21	55.59	83.45	67.52	72.34	74.30
Silvergray rockfish					3.75		
Slender sole							
Spiny dogfish							
Splitnose rockfish							
Spotted ratfish							19.16
Twoline eelpout		0.15	2.36				
Walleye pollock							0.95
Widow rockfish					1.90		
Yelloweye rockfish							
Yellowmouth rockfish							
Yellowtail rockfish							
Other	38.29	3.93	7.76	57.42	0.55	6.57	4.68
Total	955.23	176.63	182.85	981.22	853.68	1154.23	900.09